

## A SYNOPSIS OF THE ASIAN SPECIES OF DELPHINIUM, SENSU STRICTO \*

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### GROUP VII

Like Group VI, but the leaves all basal; none, or rarely one, cauline; finely dissected into laciniae mostly 1–3 mm. wide.

Not corresponding to any of the taxonomic subdivisions proposed for the genus.

### KEY TO SPECIES

1. Spur not as long as the blade of the upper sepal; plants to 2.5 dm. tall.
  2. Stem strigulose in upper part; leaf blades 3–6 cm. across; sepals deep violet, minutely strigulose, 2–3 cm. long; spur 15–20 mm. long. Yunnan. .... 133. *D. likiangense*.
  2. Stem sparsely stiff-hairy; leaf blades 2–3 cm. across; sepals pale blue, yellow-hairy, ca. 3 cm. long; spur 20–25 mm. long. Tibet. .... 130. *D. chrysotrichum*.
1. Spur equal to or longer than blade of upper sepal.
  3. Plant not more than 1.5 dm. tall; flowers 1–3 on a stem (several in *D. souliei*); leaf blades 1–2 cm. in diameter.
    4. Spur 3 cm. long; sepals greenish purple; upper petals sordid yellow. Sikang. .... 132. *D. hui*.
    4. Spur 2–2.4 cm. long; sepals blue to purplish blue; petals bluish. Szechwan.
      5. Flowers mostly several in an elongate raceme; pubescence spreading. .... 138. *D. souliei*.
      5. Flowers solitary at end of scape; pubescence retrorse. .... 137. *D. sino-scaposum*.
  3. Plant taller; flowers often more numerous; leaves larger.
    6. Axis of inflorescence and the pedicels quite glabrous except for a few hairs just below the flowers.
      7. Sepals about 20 mm. long; spur 25 mm. long; petals bluish. Yunnan. (Treated under Group VI). .... 82. *D. autumnale*.
      7. Sepals 14–16 mm. long; spur 19–21 mm. long; petals black. Szechwan. .... 131. *D. erlangshanicum*.
    6. Axis of inflorescence and the pedicels more generally pubescent.
      8. Upper sepal 23–24 mm. long; spur 27 mm. long. Szechwan. .... 136. *D. saxatile*.
      8. Upper sepal 12–20 mm. long.
        9. Bracteoles well below the flower.
          10. Upper petals entire at the tip; leaf laciniae 2–3 mm. wide. Yunnan. .... 135. *D. pycnocentrum*.

\* Continued from volume 48, p. 545.



10. Upper petals 2-toothed; leaf laciniae 1 mm. wide. Szechwan. .... 138. *D. souliei*.  
 9. Bracteoles almost against the flower; upper petal emarginate at tip.  
 11. Sepals 11–14 mm. long; spur 19–24 mm. long; petals blue.  
 12. Upper petals emarginate at tip; follicles pubescent. Yunnan. .... 134. *D. pycnocentroides*.  
 12. Upper petals entire at tip; follicles glabrous. Tibet. .... 140. *D. thibeticum*.  
 11. Sepals 15–18 mm. long; spur 14–20 mm. long; upper petals yellowish. Shensi. .... 139. *D. taipaicum*.

130. *Delphinium chrysotrichum* (sphalm. *chrysotricum*) Finet & Gagnep. Bull. Soc. Bot. France 51: 488. *pl. vii*, B. 1904. FIG. 12, A.

*Delphinium chrysotrichum* var. *pygmaeum* Ostenfeld in Hedin, Southern Tibet 6(3): 79. *pls. 1, 2*. 1922. (A list of flowering plants from inner Asia collected by Dr. Sven Hedin [compiled by Ostenfeld & Paulsen]).

Low, to 1.5 dm. tall, subprostrate, divaricately branched, sparsely stiff-pubescent above, subglabrous below, striate; leaves all radical; petioles ca. 5 cm. long, dilated at base; the hairy blades to 3 cm. in diameter, roundish, 3-parted into cuneate segments, the 2 lateral 2-lobed, the middle one 3-lobed, the lobes 3–5-toothed at the apices, obtuse, mucronate; flowers 1–2 on a branch; bracts pubescent, ca. 1 cm. long, petioled, 3-parted into narrow lobes; pedicels 2–7 cm. long, pubescent; bracteoles 2, pubescent, lance-oblong, obtuse, ca. 1 cm. long, placed near the middle of the pedicel; flowers pale blue, yellow-hairy without; upper sepal broad-ovate, 25–30 mm. long, obtuse, the spur straight or slightly curved, 20–25 mm. long, 6 mm. wide at base, obtuse; lateral sepals elliptic, 25 mm. by 12 mm., pubescent, emarginate-truncate at tip; lower sepals 25 mm. by 14 mm., obtuse; upper petals with the limb almost straight, glabrous, emarginate at apex, 15–17 mm. long, the spur 20–22 mm. long; lower petals oblique, the limb oblong, 7 mm. by 6 mm., 2-lobed over half its length, bearded over most of lower part, sparsely short ciliate, the claw 6–7 mm. long; stamens glabrous; follicles 3, bearded.

TYPE: Tibet, prov. Batang, Zambala, Aug., 1903, *Soulié* 3039 (P); seen.

ILLUSTRATION. Var. *pygmaeum* OSTENFELD in Ostenf. & Paulsen, List Fl. Pl. Inner Asia. *pl. 1, 2*. 1922.

EXAMPLES SEEN. Tibet oriental: Yargong, Batang province, *Soulié* 3904 (P), 3905 (P).

131. *Delphinium erlangshanicum* W. T. Wang, Acta Bot. Sinica 10: 86. 1962.

About 3 dm. tall; leaves about 4, basal, long petioled, glabrous; blades broadly rounded or round-ovate, 6.5–9 cm. wide, the ultimate lobules linear, 1.5–2.5 mm. wide, revolute, entire or 1-lobuled; petioles 14–18 cm.



long, broad-vaginate at base; scapes erect, 3 dm. tall, retrorsely crisped-pilose and with looser yellow hairs intermixed, racemiferous above the middle; racemes ca. 6-flowered, lax; lower bracts 22 mm. long, lanceolate, the upper 13–16 mm. long; pedicels 2–6 cm. long, suberect, slightly incurved; bracteoles near the flowers, lanceolate, 10–11 mm. long, 1.6–1.8 mm. wide, puberulent; flowers suberect, blue; sepals ovate or elliptic-ovate, puberulent, 14–16 mm. long; spur 19–21 mm. long, subulate, 3.5–4 mm. wide at base, strongly decurved; upper petals black, bifid into lanceolate lobes, loosely ciliate; lower petals black, the limb narrow-elliptic, bifid to below the middle into narrow lanceolate lobes, silky villous above the base; stamens glabrous; carpels 3, densely puberulent.

TYPE: Erlangshan, Tienchuan, Szechwan, *W. K. Hu* no. 37800 (PE), not seen; photograph (E) seen.

132. *Delphinium hui* Chen, Bull. Fan Mem. Inst. Biol. Peiping (n.s.) 1: 173. 1948.

Stem 3–3.5 cm. long, with long dense hairs; leaves all radical, long petioled, deeply 3-partite, 1.5 cm. long, 2 cm. wide, the parts 3-lobed, cuneate, the lobes ovate-acute, densely pubescent above, long-pilose beneath; peduncles 3 cm. long, long white-villous; flower horizontal, solitary, greenish purple; sepals round-ovate, the upper and 2 lower prolonged into a short tip, the 2 lateral rhombic-rounded, densely pilose without, sparsely so within, ciliate on margin; spur 3 cm. long, straight or somewhat decurved, densely hairy; upper petals sordid yellow, the laminae 6 mm. long, ovate, acute, the spur almost as long as the sepal spur; lower petals bluish yellow, the laminae oblong-ovate, apically bifid, pilose and ciliate; stamens 5 mm. long, the filaments ciliate; carpels 3, glabrous with styles 6 mm. long.

TYPE: S. Sikang, Konkaling, Chandoye, at 4500 m., *T. T. Yü* 13101, Aug. 31, 1937 (PE?), not seen. Described as having the general appearance of a violet-colored pansy.

133. *Delphinium likiangense* Franchet, Bull. Soc. Philom. Paris VIII. 5: 180. 1893. FIG. 12, B, C.

*Delphinium oliganthum* Franchet, Pl. Delavay. 1: 29. pl. 8. 1899; not Boiss., 1867.

Perennial from a creeping woody rhizome, the stem subglabrous, simple, 1–2.5 (–5) dm. tall, strigulose in upper part; leaves basal, or sometimes also 1 above; petioles 5–12 cm. long, slender, glabrous, dilated at base; leaf blades 3–6 cm. wide, subglabrous, thickish in texture, divided nearly or quite to the base into 5 segments which are in turn deeply divided into subobtuse linear lobes 2–3 mm. wide; flowers 1–3–5 on long pedicels, the bractlets lanceolate, commonly 1.5–2 cm. long, 3–5 mm. wide, placed just below the sepals; sepals deep violet, broad, minutely strigulose; upper sepal 2–3 cm. long, 1.5–2 cm. wide, broadly ovate, obtuse, the spur



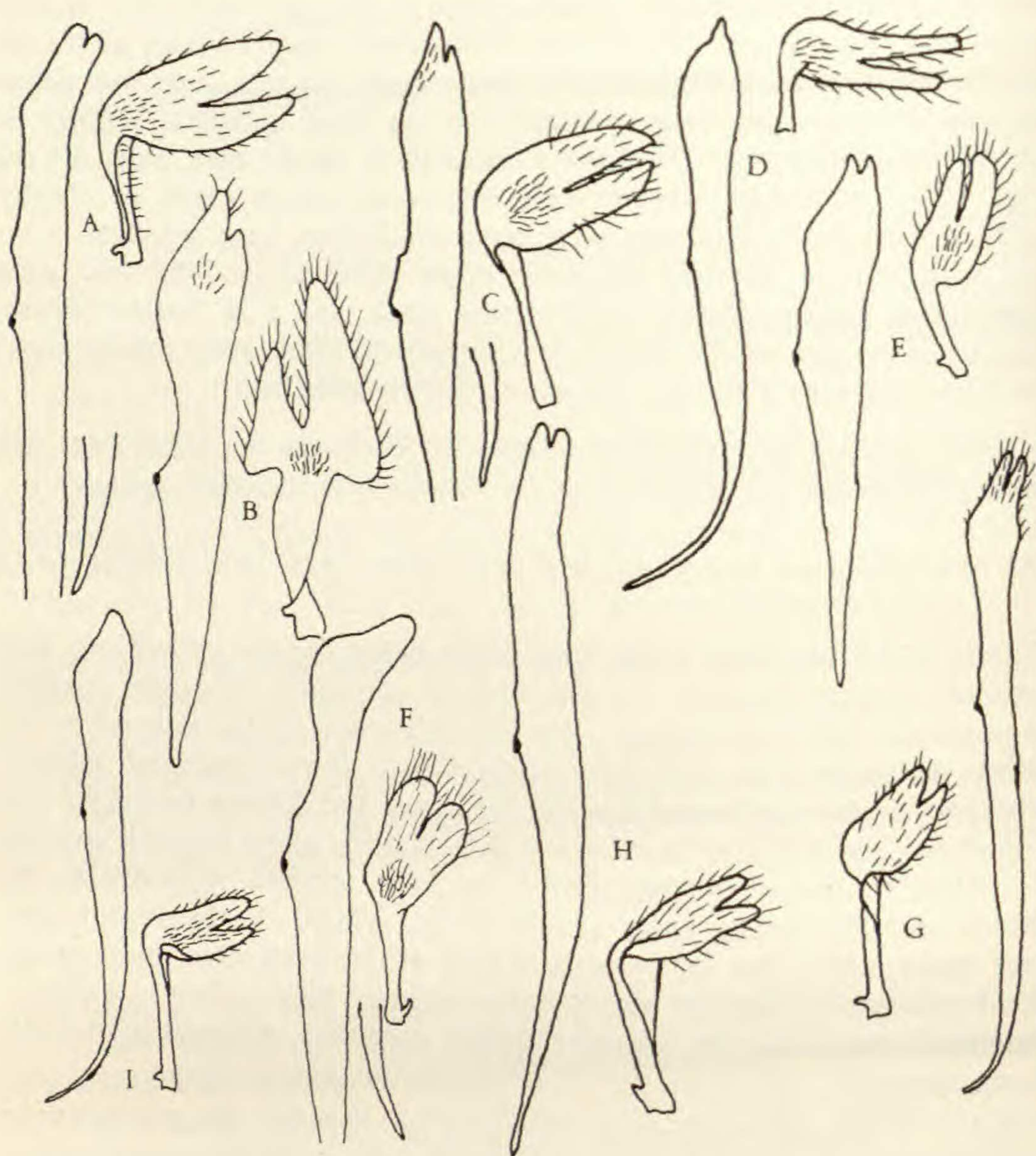


FIGURE 12. *Delphinium*, GROUP VII. Petals, the upper spurred, the lower clawed. A. *D. chrysotrichum*; blade of upper petal 15 mm. long, spur 22 mm.; blade of lower petal 7 mm. long, claw 7 mm.; drawn from Soulié 3039 (P). B. *D. likiangense*; blade of upper petal 15 mm. long, spur 15 mm.; blade of lower petal 10 mm. long, claw 7.5 mm.; drawn from Delavay 2201 TYPE (P). C. *D. likiangense*; blade of upper petal 15 mm. long, spur 23 mm.; blade of lower petal 10 mm. long, claw 7 mm.; drawn from Schneider 3251 (GH). D. *D. pycnocentroides*; blade of upper petal 11 mm. long, spur 19 mm.; blade of lower petal 8 mm. long, claw 5 mm.; drawn from Rock 17319 (US). E. *D. pycnocentroides*; blade of upper petal 10 mm. long, spur 16 mm.; blade of lower petal 7 mm. long, claw 5 mm.; drawn from Forrest 6643 (P). F. *D. pycnocentrum*; blade of upper petal 12 mm. long, spur 22 mm.; blade of lower petal 6 mm. long, claw 5 mm.; drawn from Delavay 4220 (P). G. *D. souliei*; blade of upper petal 14 mm. long, spur 21 mm. long; blade of lower petal 6 mm. long, claw 8 mm.; drawn from Soulié 2388 (NY). H. *D. souliei*; blade of upper petal 16 mm. long, spur 21 mm.; blade of lower petal 6.5 mm. long, claw 9 mm.; drawn from Harry Smith 4048 (NY). I. *D. thibeticum*; blade of upper petal 10 mm. long, spur 18 mm.; blade of lower petal 5 mm. long, claw 6 mm.; drawn from Soulié 3049 (P).



straight, horizontal, 15–20 mm. long, ca. 5 mm. wide at the base, narrowed to an acute point; lateral sepals 18–22 mm. long, 14–15 mm. wide, rounded at the tip; lower sepals 25–30 mm. long, 15–20 mm. wide, pointed; upper petals blue, the laminae almost straight, unequally 2-toothed, often with a few short hairs and ca. 15 mm. long, narrow, the spur 16–20 mm. long, straight; lower petals with a claw 6–7 mm. long, the lamina narrowly oblong-ovate, bearded, ca. 10 mm. long, cleft into 2 lance-oblong lobes ca. 5 mm. long; stamens 8–10 mm. long, the filaments slightly ciliate; anthers dark, 1 mm. long; follicles 3, finely hairy, 12–14 mm. long, 5 mm. wide, the styles an additional 1.5 mm.; seeds gray-brown, subglobose, 2–2.5 mm. long, longitudinally winged at the angles.

TYPE: Yunnan, on calcareous hills of Likiang, Suee-chan, at 4000 m., *Delavay* 2484 and 2201. At Paris number 2201 is designated as TYPE and has the parts dissected and drawn.

ILLUSTRATIONS. *Plantae Delavayanae* 1: *pl.* 8. 1889 as *D. oliganthum*; *Gardeners' Chronicle* III. 60: 128. 151. 1916.

DISTRIBUTION. About 3200 to 4600 m., in Yunnan, apparently largely in the Likiang or Lichiang Snow Range.

EXAMPLES. *C. Schneider* 3251, 2928, 3774; *G. Forrest* 11360, 11052, 11203, 22291, 16949, 3768, 6634, 6483, 2903, 15322, 15170; *Rock* 25330, 24920, 24914, 17332, 6111, 10665, 10792, 10409, 11413, 11435, 5242, 9867; *Ching* 30572.

134. *Delphinium pycnocentroides* W. T. Wang, *Acta Bot. Sinica* 10: 163–164. 1962. FIG. 12, D, E.

*Delphinium thibeticum* Finet & Gagnep. var. *schizophyllum* Hand.-Mazz. *Symb. Sinicae* 7: 275. 1931. Based on *Handel-Mazzetti* 4100 from near Lidjiang (Lichiang) (w), not seen; but his no. 7671 was also cited, and that I have seen (E, GH).

Stem 3–8 dm. tall, 2–4.5 mm. thick at base, terete, densely retrorse-strigulose, sometimes glabrous below, simple or rarely 1-branched; basal leaves ca. 3, long petioled, the leaf blades suborbicular or round-reniform, 8–12 (–20) cm. wide, cordate, trisect, the middle segment rhombic-obovate, cuneate at base, petiolulate, twice subpinnately parted, the ultimate lobes lance-linear, 1.4–5 mm. wide, slightly revolute; lateral segments obliquely flabellate, twice as wide as the middle one, narrow-cuneate at base or sometimes petiolulate, unequally 2-parted, the upper parts like those of the middle segment, but more or less oblique; petioles 8–18 (–24) cm. long, glabrous, narrow-vaginate; cauline leaf 1, smaller than basal; racemes, elongate, narrow, 5–many-flowered, lax; pedicels 2–6 cm. long, divergent, densely strigulose and with few spreading yellow glandular hairs; bracteoles next to the flower, lanceolate, 6.5–11 mm. long, 1.2–1.6 mm. wide, purplish blue, ciliate; sepals elliptic-ovate or -obovate, purplish blue, 12–14 mm. long, puberulent; spur 19–24 mm. long, cylindric-subulate or subulate, 2–3 mm. thick at base, obtuse, straight or strongly decurved; upper petals blue, emarginate or bilobulate, glabrous; lower petals blue, the laminae narrow-elliptic, bifid into 2 obtusish lance-deltoid



lobes below the middle, long-ciliate, yellow bearded at base; filaments loosely ciliate to glabrous; follicles 3, spreading-pubescent, 12–14 mm. long, the styles an additional 2.5 mm.; seeds obovate-triquetrous, 1.5–2.5 mm. long, brown, winged on the angles.

TYPE: From Yunnan, *K. M. Feng* 9033, Aug. 15, 1942 (PE?), not seen.

RANGE. In Yunnan, especially about the Lichiang Range, at elevations of 3500 to 4500 m.

EXAMPLES. *Forrest* 6533; *Rock* 17338, 10657, 17319, 10813, 6135, 5787, 10670; *C. Schneider* 2278; *Handel-Mazzetti* 7671; *T. T. Yü* 13822; *K. M. Feng* 2125; *R. C. Ching* 30566.

Wang described also var. *latisectum* (*Acta Bot. Sinica* 10: 164) with hairs of stems spreading; leaf segments broader; based on *C. W. Wang* 66226, which I have referred to *D. tatsienense*.

135. ***Delphinium pycnocentrum*** Franchet, Bull. Soc. Bot. France 33: 379. 1886. FIG. 12, F.

*Delphinium lankongense* Franchet, Bull. Soc. Bot. France 33: 378. 1886.

Based on *Delavay* no. 1844, Oct. 12, 1885, Mt. Hee-chan-men (Lankong) (P, UC), both seen.

*Delphinium pycnocentrum* var. *lankongense* (Franchet) Huth, Bot. Jahrb. 20: 465. 1895.

Perennial, from a rather woody root; stem erect, mostly simple, 2–9 dm. tall, subglabrous below to strigose or spreading-pubescent with rather long fine hairs, more densely strigose and pubescent above, the spreading hairs more or less enlarged and yellowish at the base; leaves basal, the petioles often purplish, 1–3 dm. long, subglabrous to strigulose and spreading-hairy, strongly dilated at the base; blades to 12 cm. in diameter, rounded-pentagonal in outline, 5-parted to the base, then deeply incised into numerous lance-linear lobes 2–4 mm. wide, sharply acute, subglabrous to ciliate; inflorescence racemose, few to many flowered, secund, peduncled, to 3 dm. long, strigose and with spreading hairs pustulate at the base; bracts entire to trifid, erect, 1–4 cm. long, mostly lanceolate; pedicels strict, appressed, 1–6 cm. long; bracteoles linear to linear-lanceolate, situated well below the flower; calyx bluish purple, pubescent; upper sepal oblong-obovate, 15 mm. long, 10 mm. wide, ending in an apiculate tip, the spur 25–28 mm. long, somewhat decurved, 3 mm. wide at the base, gradually narrowed to a finely pointed tip; lateral sepals rhombic-ovate, 14 mm. long, 9 mm. wide, obtuse, pubescent along midvein; lower sepals asymmetrically obovate, 13 mm. long, 6 mm. wide, obtuse, pubescent; upper petals blue, the blade somewhat oblique, 11 mm. long, 4 mm. wide, rounded, entire at tip, the spur 25 mm. long; lower petals bluish, the limb obovate-oblong, 7 mm. long, 5 mm. wide, cleft from 2 to 4.5 mm., bearded and ciliate, the claw 5 mm. long; stamens 7–7.5 mm. long, glabrous; anthers dark, 1.5 mm. long; follicles 3, somewhat pubescent to subglabrous, erect, 15–18 mm. long, ca. 4 mm. thick, the styles an additional 3.5 mm.



TYPE: Yunnan, in silvis montis Yang-in-chan, prope Lankong, alt. 3000 m.; *Delavay* 993, Oct. 8, 1884 (holotype P, isotype K); both seen.

Another collection referable to this species is from Yunnan, "au col de Huchan-men," *Delavay* 4220 (P).

136. *Delphinium saxatile* W. T. Wang, Acta Phytotax. Sinica 6: 367. 1957.

Perennial, scapose, the leaves all basal; leaf blades broadly cordate-pentagonal in outline, 2.5–7 cm. long, 3.5–7.5 cm. wide, 5-fid into obovate parts with cuneate base and 3–5 deep lance-linear lobes, these apiculate, loosely hirsute, ciliate, to ca. 5 mm. wide; petioles 6–15 cm. long, hirsute, canaliculate below; stem 2-flowered; bracts leaflike, smaller, the petiole ca. 1.5 cm. long; pedicel to 12 cm. long; bracteoles near its middle, linear, 5 mm. long, ciliate; flowers deep blue, pubescent, the sepals acuminate, ovate-oblong, the upper and lateral 23–24 mm. long, 9–10 mm. wide; spur 27 mm. long, straight or decurved, 3–4 mm. wide at base; lower sepals 28 mm. long, 8.5 mm. wide; upper petals about half as long as the sepals, the blades oblique-truncate, emarginate, ciliate, the spur 25 mm. long; lower petals 12.5 mm. long, the blade bifid to below the middle into 2 ovate-triangular lobes rounded at the apex and ciliate, the laminae yellow bearded near the base, claw ca. 6 mm. long, appendiculate; stamens glabrous, 7 mm. long; carpels 3, velutinous.

TYPE: Szechwan, Pao-hsing-hsien; Kuo-pa-yan, at 2100 m., Aug. 8, 1933, *T. H. Tü* 4366 (PE), not seen; photograph (E), seen.

137. *Delphinium sino-scaposum* W. T. Wang, Acta Bot. Sinica 10: 165. 1962.

*Delphinium scaposum* W. T. Wang, Acta Phytotax. Sinica 6: 364. 1957, not Greene, 1881.

Plant 11–16.5 cm. high; leaves all basal, glabrous, long petioled (4–13 cm.); laminae broadly reniform, 1.5–3.5 cm. long, 2–6 cm. wide, trisect, the middle segment broadly rhombic-obovate, basally cuneate-attenuate, 3-parted to below the middle, the ultimate divisions to 3.5 mm. wide; petioles 2–10 cm. long, vaginate; scapes 1-flowered, 9–16 cm. high, retrorse-pubescent; bracts sparsely pilose or trifid, 1.5–1.8 cm. long, the lobes lanceolate or the whole entire; flower purplish blue; pedicel 3–6 cm. long; bracteoles near the flower, lanceolate, 11 mm. long, subglabrous; sepals broadly elliptic, obtuse, 16.5 mm. long, 12 mm. wide, pubescent; spur 22–24 mm. long, 3 mm. thick at base, declinate; upper petals slightly shorter than sepals, upper abruptly narrowed above the middle, emarginate at apex, ciliate, spur as long as sepal spur; lower petals 16 mm. long, the limb divided to the lower third, loosely silky, as long as the claw which is appendaged; stamens glabrous, 7 mm. long; carpels 3, sparsely short-silky.



TYPE: Szechwan, T. H. Tü 3606 (PE?), not seen; photograph (E), seen.

No specimens available. The author of *Delphinium sino-scaposum* says it resembles *D. likiangense* but has 1-flowered scapes; upper petals emarginate and ciliate, lower not yellow bearded; carpels loosely silky.

138. *Delphinium souliei* Franchet, Bull. Soc. Philom. Paris VIII. 5: 172. 1893. FIG. 12, G, H.

*Delphinium paludicola* Ulbr. Notizbl. Bot. Gart. Berlin 12: 357. 1935. Based on H. Stevens 87, holotype (F), isotype (NY), seen; from Szechwan, Tachien-lu to Sachou, via Mouping.

Stems 1–4 dm. tall, slender, erect, finely hairy or pilose, simple; leaves in a basal cluster, the petioles very slender, 2–15 cm. long, subglabrous, vaginate and purplish at base; blades pale green, 1–2 cm. across, unequally many partite, the segments 2–3 times divided into linear lobules 1–2 mm. wide with revolute margins and prominent midvein beneath; flowers mostly 2–15, in a simple elongate raceme; lower bracts frequently vaginate at base, then with few linear lobes, the upper lanceolate, often purple, 1–2 cm. long; pedicels erect, pilose, 3–7 cm. long; bracteoles lance-linear, opposite, about the middle of the pedicel or above; sepals blue, the upper 15–20 mm. long, acutish, pilose, the spur slightly curved, 20–30 mm. long, ca. 5 mm. wide near the base, very gradually narrowed to the blunt tip; lateral sepals oblong-ovate, 14–15 mm. long, 7–8 mm. wide; lower sepals elliptic-ovate, 14–17 mm. long, 7 mm. wide, with an acutish prolongation at the tip; upper petals pale blue, the blade almost straight, 14–16 mm. long, deeply notched to shallowly bilobed, the spur 21 mm. long; lower petals tinged with blue, the blade oblong, sparsely bearded, 6–6.5 mm. long, bifid for ca. 2 mm., the claw broad, 8–9 mm. long; stamens glabrous, 6–7 mm. long; anthers dark, 1–1.5 mm. long; follicles 3, hairy when young, ca. 12 mm. long, reticulate-veined; seeds fuscous, broadly winged, scarcely 1 mm. long.

TYPE: Szechwan, "lieux secs a Tizou, Tché-to-chan, environs de Tatsien-lou," Sept.–Oct., 1891, R. P. Soulié 364 (P); seen.

DISTRIBUTION. In Szechwan and Sikang, 3500 to 4000 m.

REPRESENTATIVE COLLECTIONS. Szechwan: Mousset 27; Soulié 2388; E. H. Wilson 4689, 3092, 3092a; Harry Smith 4048. Sikang: Harry Smith 11732, 12056. Apparently *D. paludicola* was described for taller plants of *Delphinium souliei*.

139. *Delphinium taipaicum* W. T. Wang, Acta Bot. Sinica 10: 164–165. 1962.

Stem ca. 22 cm. tall, 3 mm. thick at base, retrorsely silky-pilose or glabrescent, basal leaves ca. 2, long petioled, the blades pentagonal-reniform, 5–8 cm. wide, trisect, the middle segments sessile, cuneate, trifid



to middle, the middle lobes obovate-ob lanceolate, trilobulate or entire, the lateral unequally bifid, the lobules ovate, obtusely mucronate, ultimate divisions lanceolate, densely strigulose beneath, loosely villous above; petioles 7–14 cm. long, loosely retrorse-pilose, narrowly vaginate; racemes 2–4-flowered, 4–7.5 cm. long; lower bracts trisect, short vaginate-petiolate, the segments trifid or entire, the others oblong-ovate or lanceolate, 14–16 mm. long; pedicels divergent, 1.5–4 cm. long, densely retrorse-pilose; bracteoles to 2 mm. distant from the sepals, oblong-ovate, 9–12 mm. long, 3–3.5 mm. wide, obtusish, loosely puberulent; sepals purplish, obovate, 15–18 mm. long, loosely puberulent; spur 14–20 mm. long, cylindric-subulate or subulate, slightly decurved; upper petals yellowish, glabrous, emarginate; lower petals purplish, the limb yellow bearded, obovate-elliptic, bilobulate to  $1/4$  its length, loosely ciliate, claw shorter than limb, appendiculate; stamens glabrous; carpels 3, villous, becoming 15 mm. long; seeds obovoid-triquetrous, 2 mm. long, dark brown, winged on angles.

TYPE: Shensi, Tai-pai-shan, Pa-sian-tai, 3900 m., Sept. 15, 1939, T. N. Liou & P. C. Tsoong 986 (PE), not seen; photograph (E), seen.

I have had no material of this species which the author differentiates from *Delphinium thibeticum* in its trisect leaves and densely villous carpels; and from *D. pycnocentrum* in the wider laciniae of the leaves, densely retrorse-pilose pedicels, and bilobed lower petals.

140. *Delphinium thibeticum* Finet & Gagnep. Bull. Soc. Bot. France 51: 489. 1904. FIG. 12, I.

*Delphinium thibeticum* var. *subintegrum* Finet & Gagnep. Bull. Soc. Bot. France 51: 489. 1904. Based on Soulié 3044, E. Tibet, between Zambal & Yargong, (P); seen.

Perennial, 6–10 dm. tall, from rather woody roots; stem slender, leafless or with 1 leaf, mostly simple, subglabrous or with scattered retrorse hairs, these becoming more numerous upward and strigulose in the inflorescence; leaves 5–7; petioles slender, to 12 or 15 cm. long, dilated at base; blades sparsely pubescent below, glabrous above, 5–10 cm. in diameter, broader than long, divided almost to base into narrowly cuneate segments, these 3-parted to about the middle and each part with 2–3 lance-oblong lobules to ca. 1 cm. long, 3–4 mm. wide, mucronate; inflorescence a simple, rather lax, many flowered raceme or with 1 or 2 smaller branches; bracts mostly entire, lance-oblong, 7–10 mm. long; pedicels ascending to suberect, strigulose, 1.5–5 cm. long; bracteoles subtending the flower, 4–5 mm. long, lance-oblong; flowers deep blue, rather loosely short-pubescent; upper sepals oblong-ovate, 11 mm. long, 7 mm. wide, apiculate, the spreading-decurved spur 20–22 mm. long, 2.5 mm. wide at the base, slender; other sepals ca. 11 mm. by 6 mm., elliptic-obovate, obtuse; petals bluish, the upper lamina rather straight, 100 mm. long, 3 mm. wide, entire at the glabrous tip, the spur 19–20 mm. long; lower laminae rather narrow-oblong, 5 mm. long, 2.5 mm. wide, short bearded from the middle



out, short-ciliate, bifid  $\frac{1}{3}$  its length into lanceolate lobes, claw 6 mm. long, appendiculate; stamens glabrous; carpels 3, becoming ca. 12 mm. long, the styles an additional 3 mm.

TYPE: Eastern Tibet, Batang province, Yargong, *Soulié* 3049 (P); seen. COLLECTIONS SEEN. Yargong: *Soulié* 3893 and 3894.

### GROUP VIII

Heavy-rooted perennials. Leaves with the ultimate divisions lanceolate to ovate, mostly over 5 mm. broad. Sepals not persistent and membranous. Petals blue or paler, not almost black. Spur usually not strongly curved.

This is a purely artificial group, not corresponding to any of the taxonomic divisions of the genus.

### KEY TO SPECIES

1. Spur obviously longer than the blade of the upper sepal.
  2. Stem and axis of inflorescence glabrous.
    3. Lamina of upper petal ca. 7 mm. long. Siberia. . . 163. *D. laxiflorum*.
    3. Lamina of upper petal 9–12 mm. long. China.
      4. Upper sepal 14–15 mm. long.
        5. Bracteoles paired near the summit of the pedicel, sometimes a third one farther down; blade of upper petal emarginate; stem angled, fistulose. Yunnan. . . . . 152. *D. georgii*.
        5. Bracteoles 2, near the middle of the pedicel; blade of upper petal erose or entire; stem not angled or fistulose. Szechwan.
          6. Stem white-hirsute below; carpels glabrous; spur often strongly curved. . . . . 162. *D. laxicymosum*.
          6. Stem glabrous below; carpels pilose; spur mostly nearly straight. . . . . 169. *D. mizugense*.
    4. Upper sepal 10–11 mm. long.
      7. Bracteoles 3–5 mm. long; carpels glabrous.
        8. Lower petal blade ca. 5 mm. wide; racemes few flowered; petioles 6–9 cm. long. Szechwan, Yunnan. . . . . 154. *D. glabricaule*.
        8. Lower petal blade ca. 3 mm. wide; racemes many flowered; petioles longer. Shansi. . . . . 153. *D. giraldii*.
      7. Bracteoles 10–12 mm. long; carpels silky. Szechwan. (This species treated in Group VI). . . . . 118. *D. sutchuense*.
2. Stem and axis of inflorescence, or at least the latter, pubescent.
  9. Pubescence of stem and inflorescence appressed or nearly so.
    10. Lamina of upper sepal 8–10 mm. long; sepals strigulose; carpels glabrous.
      11. Leaf segments petiolulate; petioles somewhat vaginate at base. . . . . 183. *D. trifoliolatum*.
      11. Leaf segments sessile; petioles not vaginate. . . . . 180. *D. sungpanense*.



10. Lamina of upper sepal 12–18 mm. long; carpels more or less pubescent.
  12. Bracteoles 10–18 mm. long, near the base of the pedicels; sepals yellow-spotted at base on back; spur slightly uncinatate at apex. Tibet. . . . . 149. *D. davidii*.
  12. Bracteoles linear, 5–10 mm. long; sepals not so spotted; spur blunt at apex.
    13. Upper petal rounded and entire at apex; flowers pale blue, the spur 18–22 mm. long. Sikang, Szechwan. . . . . 173. *C. pachycentrum*.
    13. Upper petal truncate and minutely bilobed at apex.
      14. Flowers violet, the spur 25–32 mm. long. Northwest Yunnan. . . . . 184. *D. umbrosum*.
      14. Flowers intense blue, the spur 18 mm. long. Bokhara. . . . . 165. *D. lipskii*.
9. Pubescence of stem and inflorescence spreading.
  15. Inflorescence with some hairs yellow and glandular.
    16. Upper sepal blade 18–20 mm. long; lower petal blade quite glabrous. Asia Media. . . . . 159. *D. knorringianum*.
    16. Upper sepal blade 10–15 mm. long; lower petals bearded.
      17. Limb of lower petal 8–11 mm. long, oblong, cleft to about 3 or 4 mm. Yunnan, Szechwan. . . . . 150. *D. delavayii*.
      17. Limb of lower petal mostly 4–5 mm. long.
        18. Bracteoles ca. 7–13 mm. long.
          19. Stem subglabrous; bracteoles in upper third of pedicel. Szechwan. . . . . 170. *D. muliense*.
          19. Stem spreading-hairy; bracteoles subtending the flowers. Himalaya. . . . . 151. *D. drepanocentrum*.
        18. Bracteoles shorter or, if as long, then the stems obviously spreading hairy.
          20. The bracteoles 2–3 mm. long, near or above the middle of the pedicel; spur 20–22 mm. long; upper sepal 12 mm. long. Tibet. . . . . 177. *D. sheriffii*.
          20. The bracteoles mostly 5–7 mm. long.
            21. Blades of lower cauline leaves 7–12 cm. in diameter; petioles vaginate at base; bracteoles in upper fourth of pedicel.
              22. Lower petal laminae divided two-thirds their length; sepals lilac in color. . . . . 164. *D. lilacinum*.
              22. Lower petal laminae divided one-fourth their length; sepals dark blue. . . . . 174. *D. pogonanthum*.
            21. Blades of lower cauline leaves 4–7 cm. in diameter; petioles not vaginate at base; bracteoles mostly lower on the pedicel.
              23. Sepals minutely puberulent on both



- sides; upper petals blue; carpels puberulent. Szechwan. . . . .
- ... 175. *D. pseudo-campylocentrum*.
- 23. Sepals loosely puberulent to subglabrous on the outside, glabrous within; upper petals yellowish; carpels glabrous. Honan. . . 157. *D. honanense*.
- 15. Inflorescence lacking yellow glandular hairs.
- 24. Sepals glabrous, the upper ca. 12 mm. long, spur ca. 15 mm. long. Bokhara. . . . . 182. *D. ternatum*.
- 24. Sepals with hairs.
- 25. The sepals with very fine puberulence.
- 26. Bracteoles 6–8 mm. long, subtending the flower; leaves crowded near the base of the stem. Tibet. (Treated in Group VII). . . . . 140. *D. thibeticum*.
- 26. Bracteoles smaller, a little below the flower; leaves up and down the stem. Yunnan. 181. *D. taliense*.
- 25. The sepals with coarser hairs. Yunnan to Tibet.
- 27. Blade of lower petal 6–7 mm. long; sepal spur about 20 mm. long. . . . . 174. *D. pogonanthum*.
- 27. Blade of lower petal 7–10 mm. long; sepal spur 18–28 mm. long. . . . . 156. *D. hirticaule*.
- 1. Spur not or scarcely longer than the blade of the upper sepal.
- 28. The spur considerably shorter than the blade of the upper sepal. Eastern India. . . . . 167. *D. malabaricum*.
- 28. The spur about as long as the blade of the upper sepal.
- 29. Sepals subglabrous.
- 30. Bracteoles 4–5 mm. long; leaf blades to 20 cm. broad; flowers in short racemes. Northern Iran. (Treated in Group VI). . . . . 101. *D. lanigerum*.
- 30. Bracteoles about 2 mm. long.
- 31. Leaf blades to 15 cm. broad; flowers in an open panicle, pale blue. China. . . . . 179. *D. sparsiflorum*.
- 31. Leaf blades to 5 cm. broad; flowers in racemes, blue. Iran. (Treated in Group IV). . . . . 46. *D. saniculifolium*.
- 29. Sepals pubescent.
- 32. Stem glabrous or nearly so.
- 33. Sepals with cornute appendages at tip 1–2 mm. long.
- 34. Ultimate leaf segments 5–8 mm. wide; upper petals entire, blue. Western China. 146. *D. ceratophorum*.
- 34. Ultimate leaf segments 2–4 mm. wide; upper petals emarginate, yellow. Tibet. . . 145. *D. ceratophoroides*.
- 33. Sepals lacking cornute terminal appendages. Siberia. . . . . 147. *D. cyananthum*.
- 32. Stem pubescent.
- 35. Inflorescence lacking glandular hairs.
- 36. The inflorescence with spreading hairs; upper sepals ca. 12 mm. long. Caucasus. . . . . 172. *D. osseticum*.
- 36. The inflorescence with more or less appressed hairs.
- 37. Upper sepal blade ca. 10 mm. long; lower petal blade entire, not bifid. Szechwan. . . . . 173. *D. pachycentrum*.



- 37. Upper sepal blade longer.
  - 38. Blade of upper sepal 20 mm. long.
    - 39. Upper sepal ca. 8 mm. wide, acuminate; petals violet. Szechwan. . . . . 160. *D. lancisepalum*.
    - 39. Upper sepal 10–13 mm. wide, obtuse; petals very dark. Caucasus. . . . . 148. *D. dasycarpum*.
  - 38. Blade of upper sepal mostly 13–16 mm. long, not acuminate.
    - 40. Ultimate leaf divisions long-acuminate; blade of lower petal rounded, ca. 12 mm. by 10 mm. Tibet. . . . . 141. *D. acuminatissimum*.
    - 40. Ultimate leaf divisions not long-acuminate.
      - 41. Upper petal lamina entire; entire plant gray-strigulose; spur more or less uncinatate at apex. Ural Mts. . . . . 185. *D. uralense*.
      - 41. Upper petal laminae 2-toothed.
        - 42. Flowers light blue; laminae of lower petal more or less obovate, with broad lobes; carpels strigose. Siam. . . . . 178. *D. siamense*.
        - 42. Flowers deeper blue to violet or purple.
          - 43. Bracteoles near the middle of the pedicel; sepals densely pubescent, deep blue, 13–15 mm. long. Nepal, Bhutan. . . . . 143. *D. altissimum*.
          - 43. Bracteoles near the flower.
            - 44. Sepals minutely strigulose, rich purple to deep maroon. Bhutan, Nepal. . . . . 166. *D. ludlowii*.
            - 44. Sepals blue-violet to blue with some white. China. . . . . 171. *D. orthocentrum*.
  - 35. Inflorescence with some glandular hairs.
    - 45. Upper petals bidentate at tip.
      - 46. Blade of lower petal ca. 10 mm. long; bracteoles subtending the flower. Himalaya. . . . . 176. *D. scabriflorum*.
      - 46. Blade of lower petals ca. 5 mm. long; bracteoles near the middle of the pedicel. Tibet. . . . . 155. *D. gyalanum*.



- 45. Upper petals entire at tip.
- 47. Bracteoles somewhat below the flower.
- 48. Spur 5 mm. thick near the base, incurved; lower petals with acute lobes. Tibet. . . . . 161. *D. lasiocarpum*.
- 48. Spur 2.5 mm. thick; lower petals with obtuse lobes. Lake Marka-kul. . . 142. *D. altaicum*.
- 47. Bracteoles against the flower.
- 49. Limb of lower petal ca. 5 mm. long, very short-bearded. Yunnan. . . . . 168. *D. micropetalum*.
- 49. Limb of lower petal ca. 10 mm. long, with long hairs.
- 50. Inflorescence a crowded, many-flowered raceme; bracteoles 5–6 mm. long. Tibet. . . . . 158. *D. kingianum*.
- 50. Inflorescence lax, with few to several flowers; bracteoles to 1 cm. long. Kamchatka. . . . . 144. *D. brachycentrum*.

141. ***Delphinium acuminatissimum*** W. T. Wang, Acta Bot. Sinica 10: 138. 1962. FIG. 13, B.

About 1 m. tall, smooth, purplish and glabrous above, simple, equally and densely leafy; midcauline leaves with limb broad-pentagonal, about 6–8 cm. long, 8–10 cm. wide, cordate at base, tripartite to 3 or 4 mm. above the base, the middle part broadly rhombic, long-acuminate or subcaudate-acuminate, trifid to below the middle, the secondary lobes broadly lanceolate, few toothed or incised-lobulate; the lateral parts broadly obliquely flabellate, bifid to beyond the middle, the upper secondary lobes like those of the middle part, unequally bifid, crisped-puberulent; petioles as long as the laminae, not vaginate; upper leaves gradually smaller; racemes 8.5–12 cm. long, 8–10-flowered; lower bracts leaflike, the middle trifid, upper linear; pedicels 2–6 cm. long, divergent, retrorse-puberulent toward the tip; bracteoles near the flower, linear, 7–12.5 mm. long, puberulent; sepals blue, the upper ovate-elliptic, others oblong, 14–17 mm. long, crisped-puberulent; spur 11–14 mm. long, 4 mm. wide at the base, subulate-cylindric, obtuse, straight, or slightly decurved; upper petals blue or partly yellowish, glabrous, oblique, triangular, subobtuse; lower petals blue, the limb slightly shorter than the claw or subequal, obovate or broadly elliptic, 6–10 mm. wide, rounded at apex, entire to emarginate, short-ciliate, yellow bearded near base; stamens glabrous; carpels 5, glabrous.

TYPE: Tibet, Lung-tze, Aug. 20, 1960, *K. N. Fu 1146* (PE), not seen; photo. (E), seen.

Other specimens apparently referable here, from Tibet, Raleing, 5000 m., Aug. 26, 1924, no collector given (E); Karola, Aug. 28, 1927, *F.M.B.* (E); Trakan La, Char Chu, *Ludlow & Sherriff 1987* (BM).



142. *Delphinium altaicum* Nevski in Komarov, Fl. U.S.S.R. 7: 161, 726. 1937. FIG. 13, C.

*Delphinium dictyocarpum* var. *pubiflorum* Trautv., Bull. Soc. Nat. Mosc. 33: 81. 1860; teste Regel, on sheet at Kew, collected by *Ludwig* in Siberia altaica.

*Delphinium elatum* L. var. *pubiflorum* (Trautv.) Huth, Bot. Jahrb. 20: 399. 1895.

Stem 8–10 dm. high, tinged violet below and short-strigulose, somewhat pubescent and glandular above; leaves glabrous or nearly so above, short-pubescent on nerves beneath, round-cordate or -reniform, to 2 dm. broad, sometimes subcuneate at base, palmatifid almost to base into 5 or 7 narrow-rhombic remote segments which are unequally pinnatifid into rather few divergent sharply pointed lance-ovate to lanceolate lobules 5–25 mm. long; petioles to 1 dm. or more long, not vaginate at base; racemes simple, somewhat dense, 1–2 dm. long, the axis densely short-pilose with spreading hairs; bracts linear, pubescent, ca. 10 mm. long; pedicels divergent, 1–2 cm. long, densely pubescent; bracteoles linear-filiform, 4–7 mm. long, 0.5 mm. wide, densely glandular-pubescent, located in upper part of pedicel; sepals bluish, more or less glandular-pubescent, ovate or elliptic-ovate, the upper sepal ca. 15 mm. long, 10 mm. wide, subacuminate-recurved; spur 1.5–2 cm. long, to 2.5 mm. thick, obtusely acuminate, incurved below the apex; lateral sepals obovate, 14 mm. long, 8 mm. wide, obtuse; lower sepals elliptic, 12 mm. long, 7 mm. wide; upper petals blue, the lamina almost straight, 11 mm. long, 2.5 mm. wide, bearded and ciliate, bifid about half way into oblong lobes, the claw 6 mm. long, appendiculate; stamens 6–7 mm. long; anthers dark; follicles 3, densely glandular-pilose.

TYPE: near Lake Marka-kul, Altai Mts., Siberia, *B. Keller*, Aug. 4, 1908 (LE), seen.

143. *Delphinium altissimum* Wall. Cat. no. 4718. 1830, *nomen*; *Plantae Asiaticae Rariores* 2: 25. *pl.* 128. 1831. FIG. 13, D.

*Delphinium altissimum* subsp. *wallichii* var. *nipalensis* Brühl in Brühl & King, Ann. Bot. Gard. Calc. 5: 101. 1896. Based on Nepal, *Wallich*; an 1819 specimen seen at BM. Possibly also var. *phallutensis* Brühl, *loc. cit.*, of which I have not been able to see authentic material.

Perennial from a fleshy branching or simple elongate root; stem 1–1.5 m. tall, terete, strigulose, simple below, somewhat branched above, remotely leafy; lower petioles to 3 dm. long, slightly vaginate, the upper shorter; leaf blades cordate-pentagonal in outline, to 15 cm. across, palmately 5-partite to 1 or 2 cm. from the base, the segments broadly cuneate-obovate, 3-lobed or with additional short lobes or large coarse broad teeth, acute, subglabrous above, pubescent beneath on veins; uppermost leaves trifid; inflorescence strigose with rather long white hairs, a many-flowered central rather dense raceme and some additional lax few-flowered branches below it; bracts lanceolate to linear (or the lowest



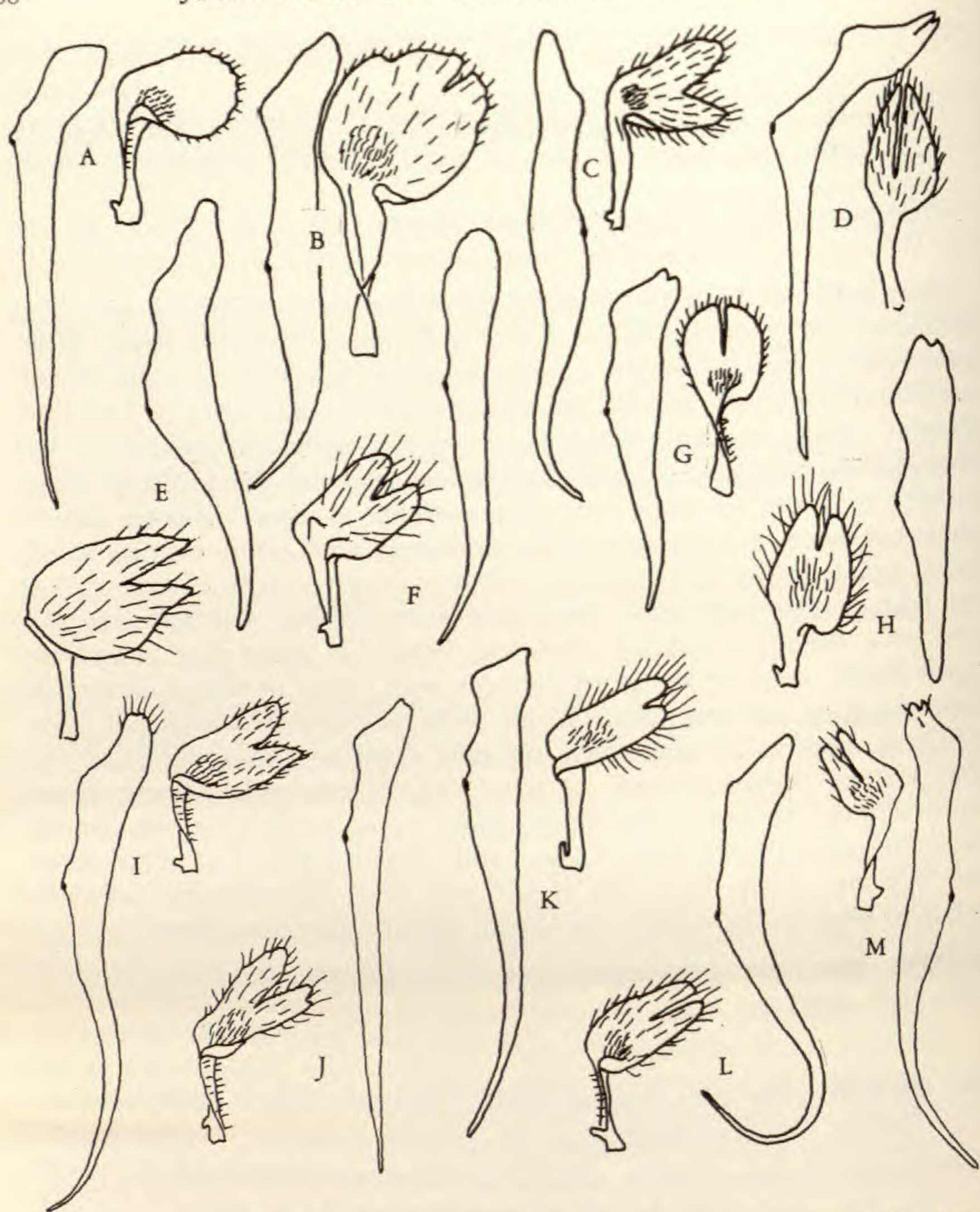


FIGURE 13. *Delphinium*, GROUP VIII. Petals, the upper spurred, the lower clawed. A. *D. sordidecaerulescens* of Group VI; blade of upper petal 14 mm. long, spur 13 mm.; blade of lower petal 7 mm. long, claw 6 mm.; drawn from *Harry Smith 3983* TYPE (UPS). B. *D. acuminatissimum* of Group VIII; blade of upper petal 14 mm. long, spur 13 mm.; blade of lower petal 9 mm. long, claw 8 mm.; drawn from *Ralieng, Tibet* (E). C. *D. altaicum* of Group VIII; blade of upper petal 11 mm. long, spur 15 mm.; blade of lower petal 6.5 mm. long, claw 6 mm.; drawn from *Keller*, TYPE (LE). D. *D. altissimum*; blade of upper petal 12 mm. long, spur 18 mm.; blade of lower petal 7 mm. long, claw 5 mm.; drawn from *Ludlow & Sherriff 8496* (BM). E. *D. brachycentrum*; blade of upper petal 12 mm. long, spur 14 mm.; blade of lower petal 10 mm. long, claw 5 mm.; drawn from *Eschscholtz* TYPE (LE). F. *D. ceratophorum*; blade of upper petal 9 mm. long, spur 15 mm.; blade of lower petal 7 mm. long, claw 5 mm.; drawn from *Rock 17321* (GH). G. *D. cyananthum*; blade of upper petal 9 mm. long, spur 13 mm.; blade of lower petal 5 mm. long, claw 5 mm.; drawn



foliose and 2–3 cm. long, the upper sometimes serrate, pubescent, to ca. 1.5 cm. long; pedicels 1–2 (–5) cm. long, divaricate, with 2 linear or lanceolate bracteoles near the middle, these 4–5 mm. long; sepals deep blue, densely pubescent; upper sepal ovate, acute, 13–15 mm. long, 5 mm. wide, the spur 20–22 mm. long, 4 mm. wide at base, slightly curved; lateral sepals oblong-obovate, 15 mm. long, 10 mm. wide, obtuse; lower sepals oblong-obovate, 15 mm. long, 8 mm. wide; petals light purple, the upper blades somewhat oblique, bidentate at apex, 11 mm. long, the spur 17–18 mm. long; lower petals with a blade 6 mm. by 3 mm., deeply bilobed into lanceolate lobes, the claw 7 mm. long; stamens 8–9 mm. long, glabrous; anthers rounded-oblong, 1 mm. long; follicles 3, pilose, cylindrical, divergent, 12 mm. by 3 mm., the beak an additional 2.5 mm.; seeds obovoid, not winged or scaly, round in cross section.

TYPE: "Crescit in sylvis montanis Nepaliae," a *Wallich* specimen from Nepal seen at BM, probably authentic material.

RANGE. Growing in old fields, stony jungle, etc., 1500–2500 m., Bhutan and Nepal and possibly Assam.

EXAMPLES: **Bhutan:** *Ludlow & Sherriff* 3496, 3558; *Cooper & Bulley* 2556, 2008. **Nepal:** *Wigram* 99; *Lall Dhwoj* in 1928; *Colom* 282; *Ludlow & Sherriff* 298. **Assam:** *Kingdon Ward* 14015.

144. *Delphinium brachycentrum* Ledeb. Fl. Rossica 1: 60. 1841.

FIG. 13, E.

*Delphinium stenosepalum* Turcz. Bull. Soc. Nat. Mosc. 27(2): 278. 1854.

Type, Tigil, *Turczaninow* (LE); seen.

*Delphinium maydellianum* Trautv. Act. Horti Petrop. 6: 7. 1879. Type, Terra Tschukschorum, *G. Maydell* Aug. 8, 1869 (LE); seen.

*Delphinium cheilanthum* Fisch. subsp. *brachycentrum* (Ledeb.) Huth, Bot. Jahrb. 20: 345. 1895.

Perennial from fibrous roots, the stem 1.5–7 dm. tall, ashy pubescent to subglabrous, 4–5 mm. thick, simple or few branched, leafy; lower leaves on slender petioles to ca. 1 dm. long and more or less vaginate at the base, the blades mostly wider than long, 5–12 cm. wide, 3–5-parted into sub-cuneate parts 1–3 or more cm. wide, these in turn coarsely few-toothed or -lobed, subglabrous to soft-pubescent above, more pubescent, often whitish,

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from *Schrenck* TYPE (LE). H. *D. dasycarpum*; blade of upper petal 9 mm. long, spur 10 mm.; blade of lower petal 6 mm. long, claw 4 mm.; drawn from *Prescott* in 1851 (PHIL). I. *D. davidii*; blade of upper petal 9 mm. long, spur 20 mm.; blade of lower petal 6 mm. long, claw 5 mm.; drawn from *David* TYPE (P). J. *D. delavayi*; blade of upper petal 8 mm. long, spur 17 mm.; blade of lower petal 7.5 mm. long, claw 5 mm.; drawn from *Delavay* 74 (P). K. *D. delavayi*; blade of upper petal 9 mm. long, spur 19 mm.; blade of lower petal 7 mm. long, claw 6.5 mm.; drawn from *C. W. Wang* 71376 (A). L. *D. drepanocentrum*; blade of upper petal 9 mm. long, spur 20 mm.; blade of lower petal 6.5 mm. long, claw 5 mm.; drawn from *Dhwoj* 0191 (BM). M. *D. georgei*; blade of upper petal 10 mm. long, spur 18 mm.; blade of lower petal 5 mm. long, claw 5 mm.; drawn from *Forrest* 11353 TYPE (E).



beneath; cauline leaves gradually reduced up the stem; flowers few to several in rather lax racemes; bracts trifid into lanceolate lobes and to 6 cm. long, or the upper entire, linear, 1–3 cm. long; pedicels ascending-arcuate, 2–8 cm. long; bracteoles setaceous, to 1 cm. long, a pair near the flower, often an additional one below; sepals deep blue, with a darker spot near the apex, villous, subacuminate; upper sepal 15–25 mm. long, 5–8 mm. wide, the spur somewhat curved, 15–20 mm. long, 3–4 mm. wide at the base, pointed; lateral sepals 16–24 mm. long, 5–9 mm. wide; lower sepals 18–28 mm. long, 6–8 mm. wide; upper petals bluish at tip, the lamina almost straight, 12 mm. long, entire, the spur 13–15 mm. long; lower petals blue, the claw 5 mm. long, the ovate-elliptic blade 10 mm. long, bearded, divided ca. 3 mm.; stamens glabrous; anthers dark, 1.2 mm. long; follicles 3, hairy.

TYPE: Kamtschatka, *Eschscholtz* (LE); seen, very densely pubescent.

Ranging from the Lena-Kolyma district to Chuch Peninsula, south to Kamtchatka, Bering Island, and Northern Kuriles according to Hultén, the last area named being in America.

From Kamtchatka I have seen among other specimens: *Komarov* 3896; *Peters* in 1831; *Eyerdam* 2; *Hultén* 733, 638.

145. *Delphinium ceratophoroides* W. T. Wang, *Acta Bot. Sinica* 10: 158. 1962.

Stems erect, ca. 3 dm. tall, 2.5 mm. thick below, smooth, glabrous, simple or one branched, with ca. 3 leaves; basal or lower cauline leaves withered by anthesis, the other cauline leaves long petioled and with broadly pentagonal blades, 2.5–4 cm. long, 3.6–7 cm. wide, cordate, 3-parted to 2 mm. above the base, the primary median parts broadly obovate-rhombic, narrow-cuneate at base, 3-parted to middle, the secondary middle parts broadly rhombic, divided into ultimate lobules 2–4 mm. wide, primary lateral parts broadly obliquely flabellate, bifid to three-fourths their length, all densely strigulose beneath, somewhat hirtellous above; petioles 5–11.5 cm. long; racemes 3–11 cm. long, lax; lower bracts trifid or linear, the others linear; pedicels 4–5.5 cm. long, divergent, glabrous, bibracteolate in upper part; bracteoles remote from flower, linear, 5–10 mm. long, puberulent; sepals blue, elliptic, 18–22 mm. long, strigulose, short-corniculate, spur 25 mm. long, subulate, 3 mm. thick basally, decurved at right angle to the obtuse, yellowish, glabrous, emarginate upper petals; lower petals blue, the limb suboblong, bifid to slightly beyond the middle, the base yellow bearded, claw ca. as long as limb, appendaged; filaments loosely ciliate; carpels 3, densely hirtellous.

TYPE: Tibet, Tsa-wa-rung, Aug., 1935, *C. W. Wang* 65706 (PE), not seen; photo. (E), seen. No material available for this species. *Delphinium ceratophoroides* was described as near *D. ceratophorum*, but the stems 3-leaved, glabrous; leaves more deeply divided, the basal ones gone by anthesis; sepal-tips shorter.



146. *Delphinium ceratophorum* Franchet, Bull. Soc. Bot. France 33: 377. 1886. FIG. 13, F.

? *Delphinium ceratophorum* var. *hirsutum* W. T. Wang, Acta Bot. Sinica 10: 158. 1962.

Perennial from an elongate rhizome with fibrous coating; stem subscapose, slender, 2–9 dm. tall, mostly glabrous except for the few hairs at the base and above, simple or slightly branched; leaves largely basal or nearly so, on slender petioles 5–15 cm. long, these scattered hairy, or sparsely retrorse-strigose or glabrous, more or less dilated at the base, the blades roundish in outline, 3–12 cm. across, divided almost to the base into 3 or 5 cuneate obovate parts which are somewhat hairy and variously incised into lanceolate or ovate, acute to obtuse divisions 5–8 mm. wide; cauline leaves few, simpler; racemes 1 to few, lax, mostly 3–7-flowered; bracts linear to sub lanceolate, or 3-parted into linear lobes, 5–15 mm. long; pedicels arched-ascending, 2–6 cm. long; bracteoles linear or wider, 5–8 mm. long and near the summit of the pedicel; sepals purplish blue, callous-cornute below the apex, the upper sepal ovate, 18–20 mm. long, 8–10 mm. wide, coarse-pubescent, the spur decurved, 20–22 mm. long, 3.5 mm. wide at the base, coarse-pubescent, attenuate to a narrow tip; lateral sepals broadly elliptic, 20 mm. by 11 mm., the cornute appendages to 2 mm. long; lower sepals broadly elliptic, 18–20 mm. long; upper petals blue or bluish at the tip, straight, narrow, the limb 9 mm. long, entire, the spur ca. 15 mm. long; lower petals blue, the claw 5–5.5 mm. long, the bearded lamina ca. 7 mm. long, 5 mm. wide, cleft for 2 mm. and with a prominent appendage at the base; stamens 5–6 mm. long, glabrous; anthers dark, 1.3 mm. long; carpels 3, hairy.

TYPE: Yunnan, "in monte Hee-Chan-Men; inter dumeta, alt. 3200 m.," *Delavay* 967 (P, K) seen, the K specimen in a type folder. But another *Delavay* number, 1845, from Lao-kouan-tsoui, below San-yn-kay, at 2500 m., is marked TYPE at (P), has dissection drawings, and probably should be taken as the holotype.

REPRESENTATIVE SPECIMENS. Yunnan: *Rock* 17321, 4746, 10737, 22852, 23080; *Ching* 21392; *Schneider* 3459; *Forrest* 10967, 6403, 6568, 2763. S. W. Szechwan: *Rock* 23992.

147. *Delphinium cyananthum* Nevski in Komarov, Fl. U.S.S.R. 7: 160. 725. 1937. FIG. 13, G.

Stems 7.5–10 dm. tall, glabrous, or slightly pilose at times below the inflorescence; petioles glabrous except on the ciliate margins or strigulose, the lower to 15 cm. long; leaves round-cordate, the lower to 15 cm. broad, palmatisect almost to the base, the segments rhombic, the base entire for 2–3 cm., then biternately incised, glabrous above and beneath or pubescent on veins beneath, ciliate-pilose on margins; raceme branched, dense, many flowered, the flowers light blue; bracts to 1 cm. or longer, subsetaceous; pedicels commonly ca. 1 cm. long, adpressed to divaricate, densely pilose;



bracteoles linear-subulate or sometimes almost linear-lanceolate, densely pilose, 1.5–5 mm. long, placed just below the flower; sepals strigulose and pubescent, densely puberulent at tips, ovate, obtuse, 10–11 mm. long, 4–8 mm. wide, spur 11–13 mm. long, to 3 mm. thick near the base; petals pale, the upper emarginate, almost straight, the lamina 9 mm. long, spur 13 mm.; lower petal 2-cleft, bearded, the lamina oblong-rounded, 5 mm. long, claw 5 mm. long; stamens ciliate; carpels 3, densely pubescent.

TYPE: Songoria, Tentek River, *Schrenk* (LE); seen.

A specimen from Irkutsk: distr. Balagansk, by *Kryschtofowitsch* in 1908 (UC) seems to belong here.

148. *Delphinium dasycarpum* Stev. ex DC. Syst. 1: 547. 1817.

FIG. 13, H.

*Delphinium speciosum* var. *dasycarpum* Rupr. Flora Caucausi 36, 287. 1869.

Stem 5–10 dm. tall, erect, striate, simple, pubescent; petioles pubescent, not dilated at base; leaf blades pubescent, 5-lobed, the lobes lanceolate, subtrifid, incised-dentate at apex, the upper leaves cuneate at base, the lower subcordate; raceme simple, pubescent, scarcely elongate; flowers a beautiful blue; axis and pedicels soft-pubescent; bracts one-third as long as the pedicels, linear-subulate; bracteoles linear-subulate; sepals subvillous, 20–25 mm. long, 9–13 mm. wide, oval; spur straight, 18–20 mm. long; petals dark, the 2 upper with emarginate lamina ca. 9 mm. long, spur 10 mm. or more; the lower deeply bifid, the ovate lamina 6 mm., the claw 4 mm. long; follicles 3, densely hairy.

TYPE: "hab. circa Nartsanam in Caucaso cisalpino," *Steven* (G?), not seen.

A specimen apparently belonging here is Caucasus, *Prescott* in 1851 (PHIL).

149. *Delphinium davidii* Franchet, Bull. Soc. Philom. Paris VIII. 5: 179. 1893.

FIG. 13, I.

*Delphinium longipes* Franchet, Nouv. Arch. Mus. Paris II. 8: 191, 192. 1886, not Moris, 1837.

*Delphinium grandiflorum* L. var. *davidii* (Franchet) Brühl in Brühl & King, Ann. Bot. Gard. Calc. 5: 98. 1896.

Perennial from a slender rhizome; stem slender, 3–4 dm. tall, setulose with spreading or appressed hairs, branching from base; basal leaves with petioles to 2.5 dm. long, slender, sparsely pilose; blades 5–8 cm. in diameter, pale above, glaucescent beneath, rounded-pentagonal in outline, tripartite into segments cuneate and entire below, trifid to the middle with oblong-ovate lobules to 15 mm. long and 5–8 mm. wide; cauline leaves shorter petioled, the uppermost 3–5-parted into entire linear segments; flowers solitary to few, corymbose-racemose; bracts like reduced leaves, to 3 cm. long; pedicels 6–10 cm. long, retrorse-strigulose; bracteoles divided to entire, 10–18 mm. long, placed well below the middle of the



pedicel; sepals dilute blue, strigose, with yellow spots at base on back; the sepals 15–20 mm. long, ovate, 10–12 mm. wide, obtuse to rounded at the tip, spur linear-subulate, decurved-spreading to slightly uncinatate at apex, 20–26 mm. long; lamina of upper petal somewhat hairy at apex, slightly fuscous, almost straight, 9 mm. long, entire; that of lower petal pale blue, oblong-ovate, short-bilobed, bearded, short-ciliate, 6 mm. long, claw 5.5 mm. long; stamens glabrous; follicles 3, hirsute.

TYPE: Tibet, "Prov. de Moupin, in lapidosis," *David*, July, 1869, (P); seen. The above citation probably is in western Szechwan. A collection by *E. H. Wilson*, 4690, from western Szechwan, seems to belong to this species, which is unusual in having the bracteoles near the base of the pedicels and was long thought to lack them.

150. *Delphinium delavayi* Franchet, Bull. Soc. Bot. France 33: 379. 1886. FIG. 13, J. K.

*Delphinium delavayi* var. *acuminatum* Franchet, Bull. Soc. Bot. France 33: 380. 1886. From meadows near Mt. Yengtze-hay, near Lankong, 3000 m., *Delavay* 1846 (P, K); seen. Leaves much incised.

*Delphinium delavayi* forma *aureum* W. T. Wang, Acta Bot. Sinica 10: 144. 1962. Isotype (A), seen, *T. T. Yü* 12548.

*Delphinium trichophorum* var. *brevistylum* f. *brevungue* Lévl. Repert. Sp. Nov. 7: 102. 1909. Type number from San Chan, *Ten* 579 (E); seen.

Perennial from a rather woody fibrous root system, the stem 5–10 dm. tall, usually simple, leafy throughout, spreading-hirsute or -pubescent, or the hairs more or less retrorse, many in the inflorescence enlarged and yellow at the base; lower leaves with petioles 3–20 cm. long, dilated at base, somewhat hairy, the blade divided almost to the base into 5 or 7 segments that are broadly cuneate, slightly incised or to about half way, then coarsely ovate toothed or sometimes more pointed, the laminae 3–10 cm. wide, not as long, mostly quite pubescent, paler beneath than above; upper leaves gradually reduced, shorter petioled, the uppermost often trisect; raceme rather dense, often many flowered; lower bracts foliaceous, trilobed, to 2 cm. long, the middle ones mostly lanceolate, entire, 1–2 cm. long, the uppermost linear; pedicels ascending-erect, 1–3 cm. long, hairy; bracteoles linear to lanceolate, subopposite near the flower, 4–10 mm. long; flowers mostly bluish violet to rich purple, pubescent; upper sepal broadly ovate, 15 mm. by 10 mm., obtusely rounded at apex, the spur decurved, 20 mm. long, 3 mm. wide at base; lateral sepals elliptic-oblong, 15 mm. by 7 mm., truncate rounded at apex; lower sepals 14–16 mm. by 9 mm., ovate-oblong, obtuse; upper petals bluish, the lamina almost straight, 10–12 mm. long, entire, spur 16–18 mm. long; lower petals with a claw 6 mm. long, blade sparsely short bearded, elliptic-oblong, 10–11 mm. long, cleft ca. 3 mm.; stamens subequal, subglabrous, 6–7 mm. long; anthers dark, 1.5 mm. long; follicles 3, somewhat hairy, reticulate veined, erect and closely parallel, 2–3 cm. long, 4–5 mm. wide, the style an additional



3–4 mm.; seeds brownish, 1.5 mm. long, densely covered with lamellate scales.

TYPE: Yunnan, San Kong to the north of Tali, Nov. 8, 1883, *Delavay* 22, holotype (P), isotype (K), photo. (BH), all seen. Two other sheets at P (*Delavay* 74 and 1847) are also labeled TYPE.

DISTRIBUTION. About 2700 to 4500 m., Yunnan and Szechwan and eastern Tibet.

REPRESENTATIVE SPECIMENS SEEN. Yunnan: *Maire* 6367, 7449; *Forrest* 2861, 2963, 6319, 28587; *Rock* 4404, 5786, 5799, 5828, 5030, 4849, 5806, 5298, 5768, 6093, 5936, 6149, 9914, 6177, 9474, 18519, 5167, 10634, 11483; *Schneider* 2143, 3576; *Ten* 69; *Yü* 22461, 14367, 15543; *Delavay* 4109; *Henry* 9668A, 9668; *Ching* 21456; *Tsai* 53738; *Feng* 2461, 217, 1697. Szechwan: *Rock* 18324, 24190; *Fang* 2944; *Peng* 145; *E. H. Wilson* 3090.

✓ 151. *Delphinium drepanocentrum* (Brühl) Munz, comb. nov.

FIG. 13, L.

*Delphinium altissimum* var. *drepanocentrum* Brühl ex Huth, Bot. Jahrb. 20: 419. 1895 and subsp. *drepanocentrum* Brühl in Brühl & King, Ann. Bot. Gard. Calc. 5: 101. 1896.

*Delphinium umbrosum* Hand.-Mazz. subsp. *drepanocentrum* (Brühl) Chowdhury ex Mukerjee, Bull. Bot. Surv. India 2: 293–5. 1961.

Perennial from rather a woody base, 4–6 dm. high, the stem simple or nearly so, spreading, and long- and soft-hairy with more or less brownish hairs throughout, often with more or less purplish epidermis, leafy; lowest leaves gone by anthesis, cauline with petioles 5–20 cm. long, somewhat dilated at base, soft-hairy; blades 3- or mostly 5-lobed to 1–2 cm. from the base, with rather long hairs above and on veins beneath, somewhat pentagonal in outline, 5–10 cm. broad, with a rather deep basal sinus, the lobes broad-rhombic, cuneate below, with rather shallow and ovate teeth 2–5 mm. deep and even broader, or sometimes shallowly 3-lobulate, then toothed, the teeth mucronate; leaves gradually reduced upward, the uppermost becoming trifoliate bracts 2–3 cm. long; inflorescence a secund, 5- to 20-flowered raceme 1–3 dm. long, more or less retrorse-hairy and apparently glandular; upper bracts linear to lance-elliptic, 1–2 cm. long; pedicels erect, 1–4 cm. long; bracteoles oblong-linear, ca. 1 mm. wide, 7–8 mm. long, subtending the flower; sepals mauve to dull purple, with rather coarse appressed hairs; upper sepal ovate, 12–13 mm. long, 8 mm. wide, obtuse, the spur curved into a half circle or merely decurved-spreading, 20–22 mm. long, 2.5 mm. wide at base, narrowed into a very slender tip; lateral sepals elliptic-oblong, 12–13 mm. long, 5–6 mm. wide, rounded-truncate at apex; lower sepals asymmetrically oblong-elliptic, 10–11 mm. long, 5 mm. wide, rounded at tip; petals bluish, the lamina of the upper slightly oblique, 9 mm. long, 2.5 mm. wide, glabrous, pointed, subentire, the very slender spur 20 mm. long; lower lamina oblong, 6.5 by 3 mm., bifid for about 4 mm. into 2 linear-oblong, bearded lobes, the claw 5 mm. long; stamens ca. 5 mm. long, glabrous; anthers dark, 0.8 mm. long;



follicles 3, 15–18 mm. long, 3 mm. wide, somewhat hairy, the style 2 mm. long; seeds obovoid angled, scarcely 1 mm. long, with transverse rows of brownish scales.

TYPE: W. Sikkim, near Wallanchun, King's collectors. Not seen.

RANGE. Growing on open and brushy slopes, 3500 m. to 5500 m., mostly in Nepal.

REPRESENTATIVE SPECIMENS. *Lall Dhwoj* 0641, 0191; *Stainton*, July 27, 1956, 1142, 1144.

152. *Delphinium georgei* Comber, Notes Bot. Gard. Edinb. 18: 236. 1934. FIG. 13, M.

Stem 9–13 dm. tall, erect, fistulose, angled, glabrous, purplish-glaucouscent, 6 mm. thick at the base; basal leaves gone by anthesis, cauline numerous, sparsely pubescent, yellowish above when dry, whitish beneath, the lower blades to 8 cm. long, 15 cm. wide, 5-fid into rhombic-cuneate segments, the interior 3-lobulate, the outer 2-lobulate, the lobules unequally and coarsely crenate-dentate, apiculate; upper leaves smaller; lower cauline petioles 12–16 cm. long, slightly vaginate; inflorescence lax, few branched or simple, about 20-flowered and 3 dm. long, the slender axis glabrous, striate; bracts linear-lanceolate, 5–10 mm. long; pedicels slender, 2–6 cm. long, divergent; bracteoles 2, subulate, inconspicuous, subopposite, near the summit of the pedicels, 2–3 mm. long and with a third subulate one 7–8 mm. long toward the base of the pedicel; upper sepal purplish blue, strigose, 15 mm. long, 10 mm. wide, ovate, acutish, the spur 22 mm. long, subulate, subfalcate, 2.5–3 mm. thick near the base; lateral sepals oblanceolate, 17 mm. long, 5 mm. wide, pubescent only along the central nerve; lower sepals subelliptic, 20 mm. long, 6 mm. wide, strigose; upper petals glabrous, the blade 10 mm. long, slightly oblique, truncate, emarginate, rarely sparsely setose, spur subfalcate; lower laminae oblique, 5 mm. by 3 mm., bilobed, with divergent lance-oblong lobes 3 mm. long, white-ciliate at apex, yellow bearded at middle, claw 6 mm. long, sparsely ciliate, appendaged; filaments 5–6 mm. long; anthers 1.5 mm. long; carpels 3, glabrous or slightly setose.

TYPE: Yunnan, on the Tong Shan in the Yangtse Bend, at 3600 to 3900 m., Sept., 1913, *G. Forrest* 11353 (E), seen.

SPECIMENS SEEN. **Kansu:** *Farrer* 159. **Yunnan:** *Yü* 14490; *Cavalerie* 7871; *Maire* 2128; *K. M. Feng* 2272, 2742; *Rock* 10539.

153. *Delphinium giraldii* Diels, Bot. Jahrb. 36. Beibl. 82: 39. 1905; Hand.-Mazz. Acta Hort. Gothob. 13: 54. 1939. FIG. 14, A.

Perennial, to 1 m. or so tall; stem glabrous; leaf blades to 22 cm. broad, 3-parted into subpetiolulate parts, the median part 2–3-lobed, the lateral parts 2-lobed at 1–2.5 cm. above the base into irregularly pinnatifid-incised, ovate or broadly rhombic-acute lobes, their ultimate divisions broadly to narrowly ovate or subtriangular, acute, strigose above and beneath; lower



petioles very long; inflorescence pyramidal with lax lateral racemes and elongate many-flowered terminal raceme, glabrous; bracts and bracteoles minute, lance-linear, 3–5 mm. long, somewhat strigulose, the bracteoles near the flower; pedicels divaricate, rather short; sepals puberulous without, apparently pale blue-violet; upper sepal round-ovate, 10 mm. by 9 mm., subapiculate, the spur straight, ca. 20 mm. long, 4 mm. wide at base, subacute; lateral sepals elliptic, 9 mm. by 5 mm., rounded-truncate at apex, puberulent especially along midrib and on margin; lower sepals asymmetrically elliptic-oblong, obtuse, 10 mm. by 4.5 mm.; petals pale, the upper lamina scarcely oblique, shallowly 2-toothed, glabrous, 9 mm. long, the spur 20 mm. long; lower laminae oblong, oblique, 5 mm. by 3 mm., divided over halfway into 2 lance-oblong, ciliate lobes, with a small patch of beard near base of blade, claw 5 mm. long; stamens 5–6 mm. long, glabrous; anthers dark, oblong, 1 mm. long; follicles 3, glabrous; seeds squamate.

TYPE: Shansi, mountains of Tsin-ling Shan, *Giraldi* (B), not seen. At UC and at K (in type cover) is probably authentic material from northern Shansi (Schensi), *Rev. Jos. Giraldi*, Aug. 4, 1897, but without collection number.

154. *Delphinium glabricaule* W. T. Wang, *Acta Bot. Sinica* 10: 154. 1962. FIG. 14, B.

Stem 7 dm. tall, ca. 8 mm. in diameter at the base, glabrous, branched, equally foliose; lower cauline leaves long petioled, the blades broadly pentagonal-cordate, 5–6 cm. long, 7–8 cm. wide, trisect to base or 0.5–1 mm. above, the middle division sessile, broadly rhombic, cuneate, entire below middle, trifid above into rhombic-ovate middle parts and oblique lateral ones, ultimately divided into few-toothed lobules, loosely strigulose on both sides along the nerves; the petioles 6–9 cm. long, glabrous, not vaginate; racemes ca. 36 cm. long, 8-flowered, lax, with glabrous axis; lower bracts lanceolate, ca. 4 cm. long, 5.5 mm. wide, others smaller, linear; pedicels glabrous, 4–9 cm. long, somewhat arcuate curved, divergent, bibracteolate above the middle; bracteoles 4–5 mm. long, linear; sepals blue, broadly obovate, 11 mm. long, puberulent, the spur 18–20 mm. long, subulate, spirally decurved at middle or below; upper petals blue, the laminae glabrous, emarginate, slightly oblique, 11 mm. long; lower petals blue, the laminae 6 mm. long, bifid into lance-triangular short-ciliate lobes and yellow bearded at the base, claw 6 mm. long stamens glabrous; carpels 3, glabrous.

TYPE: Szechwan, Hsio-chin, July 23, 1958, *H. S. Chang & Y. H. Jen* 6099 (PE), not seen; photo (E), seen.

I refer here, from Szechwan, *Rock* 16830 and 18121; from Yunnan, *R. C. Ching* 2141.

Wang says that *Delphinium glabricaule* is near *D. sungpanense*, but has leaf segments not acuminate, the spur spirally decurved, and the filaments glabrous.



155. *Delphinium gyalanum* Marquand & Airy-Shaw, Jour. Linn. Soc. Bot. 48: 156. 1929. FIG. 14, C.

? *D. dictyocarpum* DC. subsp. *tibeticum* P. Brühl in Brühl & King, Ann. Bot. Gard. Calc. 5: 100. 1896. Described as from "Southern Tibet, between the northern frontier of Sikkim and Lhasa," with two varieties *glandulosum* and *cinereum*, but no collectors named. A specimen loaned me from Gyantse, July–Sept., 1904, Capt. H. J. Walton (CAL), is labeled "var. *tibeticum*" and seems to be glandular.

Stem erect, to 2 or 2.5 m. high, glabrescent, purplish, striate, more pubescent and glandular in the inflorescence; lower petioles to 5 dm. long, sparsely pubescent or villous, somewhat vaginate at base; lower laminae subreniform in outline, 18–30 cm. in diameter, 5- or 7-lobed to the middle or below, the lobes cuneate, 4–10 cm. wide, 3-lobulate with sharp angular sinuses, then shallowly divided into acute uneven lanceolate teeth 1–5 mm. long and 1–4 mm. wide; upper leaves palmately incised-dentate, short petioled, glabrescent except for the rows of short hairs along the veins beneath; inflorescence loosely paniced, many flowered, to 3 dm. long, the racemes lax, with spreading yellow glandular hairs and somewhat appressed, non-glandular white ones; bracts linear to lanceolate, entire, 1–2 cm. long, 1–4 mm. wide, pubescent; pedicels 3–8 cm. long, arched-ascending; bracteoles near middle of pedicel, linear-oblong, 9–10 mm. long; sepals deep blue, to violet or pale mauve, pubescent, the upper sepal ovate, 16–17 mm. long, 9–10 mm. wide, subobtuse, the spur straight or slightly decurved, 18–22 mm. long, 3 mm. wide at base, obtuse; lateral sepals obovate, 19 mm. by 12 mm., with a truncate-obtuse prolongation at apex; lower sepals similar, but more acute; upper petals bluish, the limb lanceolate, shallowly bidentate, 10 mm. long, 4–5 mm. wide, the spur 15–16 mm. long; lower laminae ovate, 5 mm. by 3 mm., yellow bearded at base, bifid into lanceolate hairy lobes 3 mm. long, the claw 5 mm. long; stamens 5–6 mm. long; anthers dark, 1 mm. long; follicles 3, densely pilose to subglabrous, 8–12 mm. by 4–5 mm., the styles an additional 4 mm. long; seeds dark, angled-obovoid, squamate, ca. 1.2 mm. long.

TYPE: Southeastern Tibet, in shady thickets on exposed flank of valley, gorge of the Tsang-po near Gyala, 2700 m., July 21, 1924, F. Kingdon Ward 5969 (K) seen; isotype (E), seen.

REPRESENTATIVE EXAMPLES: Southeastern Tibet: Ludlow, Sherriff & Taylor 5329, 5824, 5701, 4849, 6250; Kingdon Ward 12031; Ludlow & Sherriff 2777, 8789, 9893, 8781, 1942, 2461, 2421, 9632, 11108, 528; F. Spencer Chapman 187, 201; Hingston 367, 408; H. J. Walton 106; H. M. Stewart in 1907; L. A. Waddell in 1904.

156. *Delphinium hirticaule* Franchet, Jour. Bot. Morot 8: 275. 1894. FIG. 14, D.

*Delphinium hirticaule* var. *micranthum* Finet & Gagnep. Bull. Soc. Bot. France 51: 485. 1905. Based on *Farges 630 bis*, pro parte, with lamina of lower petal deeply divided.



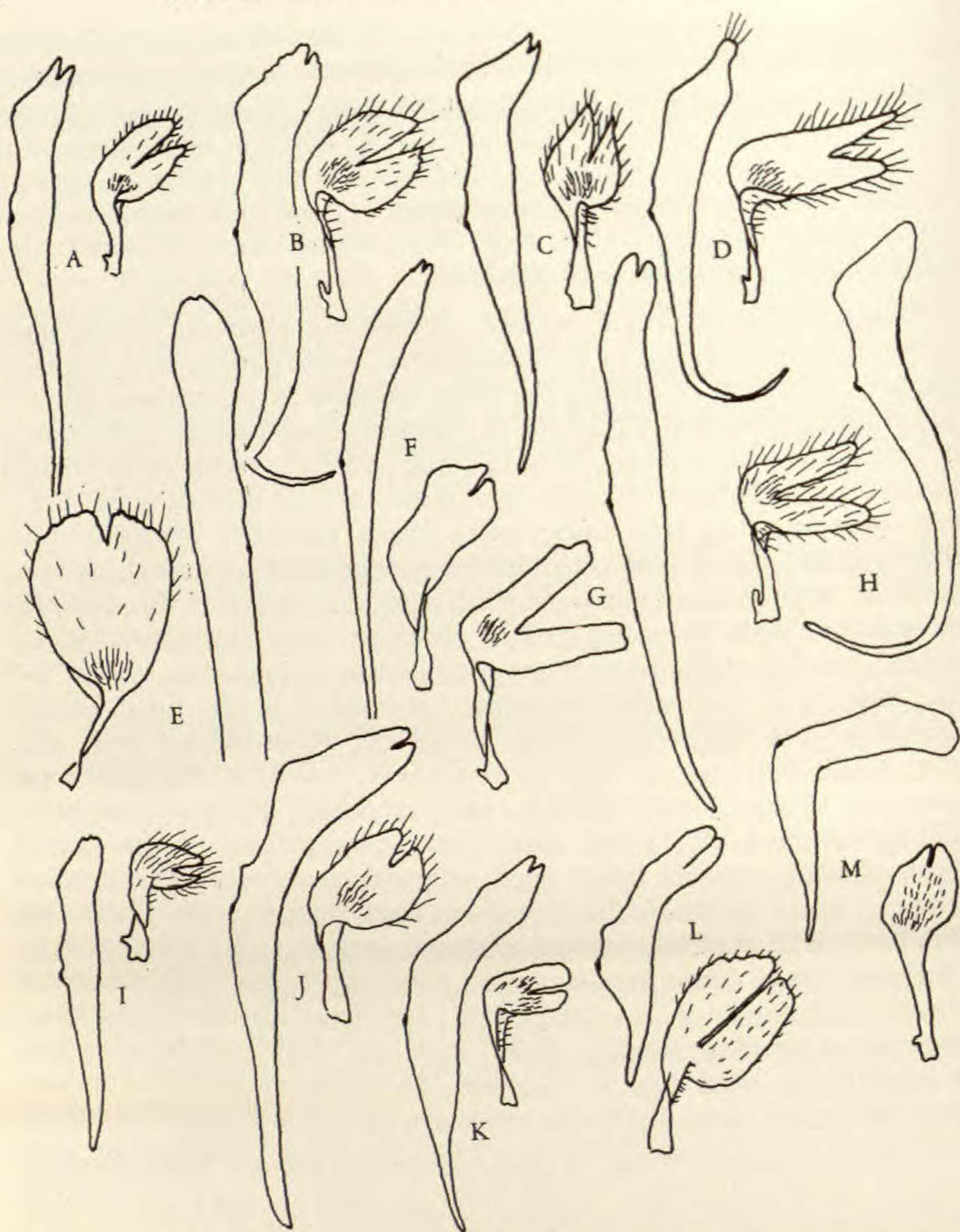


FIGURE 14. *Delphinium*, GROUP VIII. Petals, the upper spurred, the lower clawed. A. *D. giraldii*; blade of upper petal 9 mm. long, spur 20 mm.; blade of lower petal 5 mm. long, claw 5 mm.; drawn from *Giraldi* in 1897 (UC). B. *D. glabricaule*; blade of upper petal 11 mm. long, spur 18 mm.; blade of lower petal 6.5 mm. long, claw 6 mm.; drawn from *Rock* 16830 (US). C. *D. gyalanum*; blade of upper petal 11 mm. long, spur 16 mm.; blade of lower petal 5 mm. long, claw 5 mm.; drawn from *Ludlow, Sherriff & Taylor* 5329 (BM). D. *D. hirticaule*; blade of upper petal 11 mm. long, spur 16 mm.; blade of lower petal 9 mm. long, claw 6 mm.; drawn from *Maire* 6367 (UC). E. *D. kingianum*; blade of upper petal 14 mm. long, spur 20 mm.; blade of lower petal 10 mm. long, claw 5 mm.; drawn from *Ludlow & Sherriff* 527 (E). F. *D. knorringianum*; blade of upper petal 14 mm. long, spur 22 mm.; blade of lower petal 7 mm. long, claw 6 mm.; drawn from *Knorring* 368 TYPE (LE). G. *D. lancisepalum*; blade of upper petal 15 mm. long, spur 19 mm.; blade of lower petal 9 mm. long,



*Delphinium coelestinum* Franchet, Jour. Bot. Morot 8: 276. 1894. Type, *Farges 630 ter* (P) with lower petals deeply divided. Seen.

*Delphinium hirticaule* var. *coelestinum* (Franchet) Finet & Gagnep. Bull. Soc. Bot. France 51: 486. 1905.

Perennial from a fibrous root; stem simple or branched above, 3–10 dm. tall, somewhat spreading hairy below, glabrous to densely hairy above; leaves largely basal, the petioles slender, sparsely setose, 5–12 cm. long, slightly dilated at the base; blades round-pentagonal in outline, 2–8 cm. in diameter, sparsely setulose on both surfaces, 5-parted to near the base into cuneate-obovate segments to ca. 3 cm. wide, these 3- or more lobed or toothed, the ultimate lobes lance-oblong to ovate, rounded, mostly 3–7 mm. wide; flowers few in an open raceme, or with 1–2 lower branches; bracts mostly simple, 8–12 mm. long, linear to lance-linear; pedicels subglabrous or more or less setulose, mostly 1–4 cm. long, ascending; bracteoles linear to lance-linear, to ca. 1 cm. long and placed near the flower; sepals deep blue, with short stiff hairs; upper sepal ovate, 15–17 mm. long, 7–9 mm. wide, subacute, the spur horizontal, somewhat decurved, 18–23 mm. long, 3 mm. wide at the base, gradually narrowed to a subacute point; lateral sepals oblong-obovate, 15–20 mm. long, 8–10 mm. wide, rounded at apex, with median line of hair; lower sepals 16–20 mm. long, 7–9 mm. wide, obtuse, more generally pubescent; upper petals pale, the laminae almost straight, entire, 11–13 mm. long, more or less setose at tip, the spur 10–20 mm. long; lower petals bluish, the blade oblique, rounded or deeply lobed at the apex, 7 mm. by 5 mm., with a basal patch of bearding and ciliate on margin; stamens 7–8 mm. long, glabrous; anthers dark, 1.5 mm. long; follicles 3, sparsely pilose, 10–17 mm. long, 3 mm. wide, erect, the styles an additional 2.5 mm. long; seeds brown, 3-angled, lamellate on all sides, ca. 1.8 mm. long.

TYPE: Szechwan, district of Tchen-kéou-tin, *Farges 630 bis* (P) seen, some sheets with this number having lower petals more deeply divided than others; same true of specimens at (K).

SPECIMENS SEEN: Szechwan: *Rock 18205*; *T. L. Tai 101803*. Yunnan: *Feng 2841*; *Maire 6367*; *Ching 21945*; *Rock 5167, 6305, 17317*; *Schneider 1867*. Much material that has been referred here belongs to *D. ceratophorum*.

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claw 6.5 mm.; drawn from *Harry Smith 11248* (NY). H. *D. laxicymosum*; blade of upper petal 11 mm. long, spur 27 mm.; blade of lower petal 7 mm. long, claw 6 mm.; drawn from *F. T. Wang 21767* (A). I. *D. laxiflorum*; blade of upper petal 7 mm. long, spur 10 mm.; blade of lower petal 4 mm. long, claw 4 mm.; drawn from *Burdakova* in 1931 (NY). J. *D. lipskii*; blade of upper petal 13 mm. long, spur 19 mm.; blade of lower petal 6 mm. long, claw 5 mm.; drawn from *Korshinsky* TYPE (LE). K. *D. ludlowii*; blade of upper petal 10 mm. long, spur 12 mm.; blade of lower petal 4.5 mm. long, claw 5 mm.; drawn from *Ludlow & Sherriff 894* (E). L. *D. malabaricum*; blade of upper petal 10 mm. long, spur 7 mm.; blade of lower petal 7 mm. long, claw 5 mm.; drawn from *Santapau 11552* (MO). M. *D. micropetalum*; blade of upper petal 9 mm. long, spur 12 mm.; blade of lower petal 5 mm. long, claw 6.5 mm.; drawn from *Yü 20783* (E).



157. *Delphinium honanense* W. T. Wang, Acta Bot. Sinica 10: 146. 1962.

Stems 5–6 dm. tall, 5–6 mm. thick at base, angled, glabrous, simple, equally leafy; lower and middle cauline leaves with rather long petioles, the blades 6–7 cm. long, 7–10 cm. wide, cordate, tripartite rather deeply, the middle part broadly rhombic, acute or short-acuminate, entire in lower half, above the middle unequally ovate-dentate or indistinctly 3-lobulate, the lateral parts bifid to below the middle, the upper lobes much as in the middle part, loosely strigose beneath or glabrescent, with stiffer hairs above; petioles 1.5–2 times as long as blades, loosely hirsute, not vaginate; upper leaves reduced; racemes 8–11 cm. long, ca. 10-flowered; lower bracts trifid, others lance-linear to linear, 8–17 mm. long; pedicels 1–2.5 cm. long, obliquely spreading, with white and yellow-glandular hairs; bracteoles near the middle of the pedicels, linear, 5–8 mm. long, puberulent; sepals purple, elliptic- to narrow-ovate, 15–16 mm. long, loosely puberulent to subglabrous; spur 20–21 mm. long, subulate, 3 mm. wide at base, slightly decurved; upper petals yellowish, glabrous, emarginate or bilobulate; lower petals blue, the limb bifid into obtuse triangular lobes to beyond the middle, ciliate, yellow bearded near base, claw subequal, short-appendiculate; stamens glabrous; carpels 3, glabrous.

TYPE: Honan, Sichia, May 14, 1959, Honan Exped. no. 534 (PE), not seen; photo. (E), seen.

Said to be near *D. hirticaule*, but stems glabrous, parts of leaves less divided. I have seen no material I could refer here.

158. *Delphinium kingianum* Brühl ex Huth, Bot. Jahrb. 20: 469. 1895; Brühl, Ann. Bot. Gard. Calc. 5: 108. 1896, *pro synonym*.

FIG. 14, E.

*Delphinium pachycentrum* ssp. *tsangensis* vars. *dasycarpa* and *lasiocarpa* Brühl, loc. cit. 108 — according to Wang, Acta Bot. Sinica 10: 138. 1962.

*Delphinium kingianum* var. *leiocarpum* Brühl ex Huth, loc. cit.

? *Delphinium kingianum* var. *eglandulosum* Wang, loc. cit.

From a thick central fibrous root, stems in clumps, 3–4 dm. tall, 3–5 mm. thick, subglabrous below, densely spreading-pubescent upward with yellow glandular hairs, densely leafy, the cauline leaves 3–10 cm. across, subglabrous above, paler and more strigose beneath, palmatifid almost to base into narrow-cuneate segments which are sharply lobed about half way, then with sharp lanceolate teeth 2–10 mm. long, 1–3 mm. wide; petioles slender, 2–5 cm. long, scarcely widened at base; inflorescence a crowded many flowered raceme to ca. 1 dm. long, densely glandular-pubescent; lower bracts reduced leaves, upper lance-linear, 6–10 mm. long; pedicels 1–4 cm. long, arched-ascending; bracteoles lance-linear, acuminate, 5–6 mm. long, subtending the flower; sepals purplish blue, white-villous, the upper lance-ovate, 20 mm. by 10 mm., rounded-obtuse, the spur 20–22 mm. long, 3 mm. wide at base, quite sharply pointed; lateral sepals oblong,



22 mm. by 8 mm., rounded at tip; lower sepals oblong, 22 mm. by 7 mm., narrower at tip; upper petals bluish, the laminae almost straight, 14 mm. long, 3 mm. wide, entire, rounded at tip, the spur 19–20 mm. long; lower petals with an obovate lamina 12 mm. by 8 mm., deeply emarginate, bearded at base, sparsely so above, claw 5 mm. long, appendiculate; stamens 6–7 mm. long; carpels 5, pubescent to almost glabrous.

TYPE: Between the northern frontier of Sikkim and Lhasa, King's collector. Not seen.

REPRESENTATIVE SPECIMENS: **Tibet:** *Ludlow & Sherriff* 527, 855; *B. J. Gould* 508; *L. A. Waddell*, Sept. 5, 1904.

159. *Delphinium knorringianum* B. Fedtsch. Jour. Roy. Hort. Soc. 61: 196, 197, fig. 43. 1936. FIG. 14, F.

Perennial from an elongate root, the stems ascending to suberect, 3.5–4.5 dm. tall, more or less branched above, with short stiff spreading hairs below and glandular in the inflorescence; leaves mostly basal, with petioles 8–12 cm. long, slightly dilated below; blades 4–5 cm. broad, more or less pentagonal, 5-parted, the parts cuneate toward base, indistinctly 5-lobed at apex, the lobes oblong-ovate, more or less rounded at tip, to 7 mm. wide; stem leaves reduced, the upper sessile, with entire broadly linear lobes; inflorescence with one to few spreading branches and bristly glandular-hairy, each branch subcorymbose, with 3–5 blue-purple flowers; lower bracts 3–5-parted; pedicels 3–7 cm. long, divaricate; bracteoles 2, linear, ca. 4 mm. long, near the middle of the pedicel; upper sepal subglabrous to glandular-pubescent, ovate, 17–18 mm. long, 11 mm. wide, obtuse, the spur straight, 21–22 mm. long, bilobed at tip, the lobes divergent; lateral sepals broadly ovate, 22 mm. by 12 mm., pubescent; lower sepals pubescent, 22 mm. by 12 mm., ovate; petals pale, blue purple, the upper with elongate-elliptic limb, clawed, bidentate, glabrous, ca. 14 mm. long, the spur 19–20 mm. long; lower petals with elongate-linear limb, rounded at top, bidentate, 6 mm. long, narrowed gradually into a claw 7 mm. long; follicles 2–3, densely pubescent.

TYPE: Asia Media, Kirghistan, Osh district, sources of Akhbura River (Alai Range), July, 1913, *O. E. Knorring* 368 (LE); seen. Illustrated in original description. No other material seen.

160. *Delphinium lancisepalum* Hand.-Mazz. Acta Horti Gothob. 13: 55. fig. 2a. 1939. FIG. 14, G.

*Delphinium pachycentrum* Hemsl. var. *lancisepalum* (Hand.-Mazz.) W. T. Wang, Acta Bot. Sinica 10: 140. 1962 and var. *pseudo-lancisepalum*, Wang, loc. cit.

Stem 2–5 dm. tall, 3–4 mm. thick, simple or with few short sterile branches, white-strigulose, densely and equally leafy to inflorescence; petioles mostly 3–6 cm. long, slender, more or less strigulose, dilated at base; blades cordate-orbicular in outline, mostly 4–9 cm. in diameter,



minutely strigulose on both the upper green and lower pale surfaces, trifid almost to base, the 2 lateral segments deeply bifid, the 5 parts thus created rhombic-lanceolate to -ovate, trilobed to about the middle then deeply toothed, the teeth lance-oblong to ovate, 2–4 mm. wide, acute; inflorescence a dense raceme, 5–12-flowered, with dense retrorse pubescence; lower bracts leafy, upper linear, filiform, 1–1.2 cm. long; pedicels 1.5–5 cm. long, almost erect; bracteoles filiform, 10–12 mm. long, next to the flower; sepals blue to pinkish, somewhat strigulose and ciliate, the upper lance-ovate, 19–20 mm. long, 8 mm. wide, acuminate, the spur almost straight, 20–23 mm. long; lateral sepals lance-ovate, 20–22 mm. long, 8 mm. wide, acute; lower sepals with about the same dimension, more acuminate; upper petals deep violet, the laminae almost straight, deeply retuse, 15 mm. long, glabrous, the spur 19 mm. long; lower petals with laminae 9 mm. long, 7.5 mm. wide, with a small basal patch of bristly hairs and 2 gaping oblong lobes 4–5 mm. long, claw 6.5 mm. long; stamens 7–8 mm. long, quite broad in lower part, glabrous or ciliate; anthers dark, oblong, 1.2–1.4 mm. long; follicles 3, hairy.

TYPE: Sikang, district Kangting (Tachienlu), Ta-pao-shan, 4500 m., Aug. 20, 1934, *Harry Smith 11248* (w?), not seen; isotypes (A, BM, MO, NY), seen.

COLLECTIONS SEEN: Szechwan: *Legendre 1563*; *H. Li 78175*.

161. *Delphinium lasiocarpum* Tamura, *Acta Phytotax. & Geobot.* Kyoto 15: 196. 1954.

Stem striate, sparsely recurved-pilose or subglabrous; cauline leaves short petioled, the blades reniform, 6 cm. long, 12 cm. wide, curved-pilose on veins of both sides, tripartite, the middle segment pinnatifid, the lateral bifid, the lobes unequally pinnatifid and the lower incised; inflorescence many flowered, paniculately branched, yellow-villous above; lower bracts 3-parted or trifid, the upper linear; pedicels to 5 cm. long, with opposite bracteoles above the middle; flowers blue, 2.5 cm. in diameter, the spur longer than the sepals, to 20 mm. long, 5 mm. wide at base, slightly curved; upper petals glabrous, 25 mm. long, with incurved spur 7–8 mm. long; lower petals bifid or lobed, white bearded, the lobes acute or obtuse; follicles 3, villous, 10 mm. long without the style, this 4–5 mm. long; seeds smooth, winged.

TYPE: Tibet near Lhasa, Panchogan, 103900 (KYO); not seen. I have been unable to borrow any material of this species, so can offer only a translation of the original description. The author thinks it related to *Delphinium altissimum*.

162. *Delphinium laxicymosum* W. T. Wang, *Acta Bot. Sinica* 10: 148. 1962.

FIG. 14, H.

Stem 5–7.5 dm. tall, ca. 4 mm. thick at base, loosely white-hirsute below, glabrous above, branched, equally foliose; lower cauline and middle leaves



longish petioled, the blades broadly pentagonal, 4–8 cm. long, 6–12.5 cm. wide, cordate, 3-parted almost to base, the middle part rhombic, the lateral obliquely triangular-ovate, all lobulate and toothed, loosely strigulose on both surfaces; petioles 1.5 to 2 times the laminae, loosely hirsute; upper cauline leaves reduced; flowers in 3–5-flowered corymbiform clusters; lower bracts to 3 cm. long, trifid to entire, upper subfiliform; pedicels 2–7 cm. long, glabrous, divergent; bracteoles near the middle of the pedicel, filiform, 2–2.5 mm. long, 0.2 mm. wide; sepals intense blue, elliptic-obovate or elliptic, 14 mm. long, puberulent, the spur 23–25 mm. long, subulate, slightly to much decurved; upper petals yellowish, 11 mm. long; lower blue, 6 mm. long, bifid to slightly below the middle into lance-oblong obtuse lobes, long-ciliate, yellow bearded near base, claw 6 mm. long, short-appendiculate; stamens glabrous; carpels 3, glabrous.

TYPE: Szechwan, north of Wen-chuan Hsien, 3100 m., July 20, 1930, *F. T. Wang* 21767 isotype (A), seen.

Another collection probably to be referred here is Tsé-Kou, *Abbé Monbeig* (UC).

Wang said his proposed species, *Delphinium laxicymosum*, is near *D. potaninii*, but with stem and petioles hirsute and inflorescence more cymose.

163. *Delphinium laxiflorum* DC. Syst. 1: 360. 1817. FIG. 14, I.

*Delphinium villosum* Stev. ex DC. var. *laxiflorum* (DC.) Huth, Bot. Jahrb. 20: 412. 1895.

? *Delphinium elatum* var. *anomalum* Kunth ex Huth, loc. cit. 399. From the Altai Mts. and with light colored petals, hence not *D. elatum*.

*Delphinium amoenum* Stev. ex DC. Syst. 1: 546. 1817. Placed in synonymy here by Nevski in Komarov, Fl. U.S.S.R. 7: 158. 1937. I have not seen authentic material.

Said to be vegetatively like *Delphinium dyctiocarpum* DC. (Group IX), i.e. 6–15 dm. tall, robust, quite glabrous, large leaved, the lower petioles to 2 dm. long; leaf blades rounded, pentagonal in outline, the upper ca. 4 cm., the lower 15 cm. broad, 3-, 5-, or 7-parted to within 1 or 2 cm. of the base, the parts not deeply laciniate; inflorescence a dense raceme or open panicle, many flowered; bracts mostly entire; pedicels 1–3 cm. long; bracteoles linear, 3–7 mm. long, well below the flower; sepals violet-blue, glabrous, 10–12 mm. long, spur 12–20 mm. long; petals blue, or the upper whitish, the upper erose or scarcely bidentate, the laminae 7 mm. long, spur 10 mm.; lower petals pale blue, the laminae 4 mm. long, 2-lobed, bearded, the claw 4 mm. long; ovary apparently glabrous to pubescent.

TYPE: "Hab. in Sibiria (hortul.)" (G? not seen). A specimen loaned from Leningrad as "*D. dictyocarpum* D. Altai, 1826, Herb. Ledebour" has blue petals and seems to be authentic material of *D. laxiflorum*.

Some other specimens apparently referable here are all Siberian and differ from *D. dyctiocarpum* in not having almost black petals.

Siberia: Semipalatinsk, *Krylov & Sergievskaya* in 1929 (NY); *Karelin & Kiri-*



loff in 1840 (MO). Altai borealis, *Erastova* in 1909 (BM); *V. Burdakova* in 1931 (NY); *Chaffanjon* 1019 (P).

164. *Delphinium lilacinum* Hand.-Mazz. Symb. Sinicae 7: 277. 1931.

*Delphinium handelianum* W. T. Wang, Acta Phytotax. Sinica 6: 365. 1957.

Rhizome very short, the roots slender; stem 5–6 dm. tall, striate, hairy, equally leafy, weakly branched almost from base; leaves pentagonal, 7–12 cm. in diameter, 5-fid to three-fourths or seven-eighths their length, the divisions rhombic-ovate, the margins rarely contiguous, deeply incised, then coarsely crenate, green on both surfaces, sparsely strigose above, reticulate veined beneath; petioles one and one-half times as long as the middle laminae, the upper half as long, more or less vaginate, sparsely hirsute; racemes terminal on stems and branches, to 14-flowered, densely and retrorsely white-strigulose and somewhat yellow-hirsute; lower bract 3-parted, others entire, upper subulate-lanceolate, half as long as pedicels or the uppermost as long; pedicels divergent, 1–5 cm. long; bracteoles in upper fourth of pedicel, lance-linear, ca. 5 mm. long, ciliate; sepals lilac, broadly ovate, rounded at apex, sinuate-attenuate, white strigulose and yellow-hispid, densely ciliolate; spur about twice as long as blade, attenuate; petals about equal to sepals, the upper 3 mm. wide, with 2 linear lobes 1.5 mm. long; lower petals with lamina equaling claw, 3 mm. wide, cut into 2 narrow lobes for two-thirds its length, ciliate and long white-bearded; stamens 6 mm. long; anthers brown, oblong, 1 mm. long; carpels 3, sparsely white-strigose.

TYPE: Beyendjing (Peyentsin), Yunnan, forests near Guti, Aug. 29, 1919, *Ten* 1292 (PE?); not seen. The only collection that I have seen which seems to me possibly representing this species is *Cavalerie* 2936 (E), also from Yunnan. This proposed species, *Delphinium lilacinum*, may be too close to *D. pogonanthum*.

165. *Delphinium lipskii* Korsh. Bull. Acad. Pétersb. V. 9: 402. 1898.  
FIG. 14, J.

Rhizome woody, elongate; stems erect, 6–7.5 dm. tall, cinereous-pubescent below, glabrous in the inflorescence, openly branched above; leaves grayish pubescent beneath, glabrous above, 4–5 cm. wide, the lower broadly reniform, trisect almost to the base, the segments sessile, the lateral 2-parted almost to base, all segments 3-lobed into entire or incised lobules (these oblong, 4–10 mm. long, 3–6 mm. wide); parts of the upper leaves lanceolate, entire; bracts all entire, lance-linear, 4–5 mm. long; pedicels glabrous, 3–4.5 cm. long; bracteoles 2–3, minute, at middle of pedicel or below; upper sepal ca. 14 mm. by 7 mm., apiculate, intense blue, spur 18 mm. long, 3.5 mm. wide at base, spreading, subcylindric, blunt; lateral sepals oblong-elliptic, 14 mm. by 8 mm., rounded; lower sepals 14 mm. by 6 mm., apiculate; upper petals pale blue, oblique, the laminae



ca. 13 mm. by 4 mm., shallowly incised, the spur ca. 19 mm. long; lower petals blue, the round-obovate laminae 6 mm. long, 4 mm. wide, deeply incised, white-hairy, the claw 5 mm. long; stamens 7–8 mm. long, ciliate; anthers yellow, 1 mm. long; follicles 3, hirsute, 14–20 mm. long, with blue styles an additional 2 mm. long.

TYPE: Bucharā (Bokhara), Darwaz, near Chumbau River, between Sary-dasch and Kala-i-chum, 1300 to 1600 m., June, 1897, *Korshinsky* (LE), seen; photo. (A), seen.

166. *Delphinium ludlowii* Munz, sp. nov.

FIG. 14, K.

*Delphinium ludlowianum* Chowdhury ex Mukerjee, Bull. Bot. Surv. India 2: 293–296. 1960; *nomen*.

About 1 m. tall, the stems sparingly and minutely strigulose, more densely so in the inflorescence, rather slender, remotely leafy; cauline leaves pentagonal-reniform in outline, green above, paler beneath, strigulose on both surfaces, to about 12 cm. broad, 5-fid to about 1 cm. from base, the segments cuneate-rhombic, incised about halfway to the midrib into 3 broad lobes, these shallowly and evenly rather coarsely toothed, the teeth lance-oblong, mostly 3–5 mm. long, 2–3 mm. wide, mucronate; petioles to ca. 12 cm. long, slender, subglabrous, slightly vaginate at base; leaves gradually reduced toward the inflorescence into leafy bracts; inflorescence mostly a lax 6–12-flowered raceme 1–2.5 dm. long, closely strigulose; upper bracts petiolate, lanceolate, 1–2.5 cm. long, 2–6 mm. wide; pedicels arched, 1–5 cm. long; bractlets subtending the flower, subspatulate, 4–6 mm. long; sepals rich purple to pale maroon, minutely strigulose; the upper sepal oblong-ovate, 13–15 mm. long, 11–12 mm. wide, with an extended blunt tip, the spur spreading, 12–15 mm. long, 4.5 mm. wide at base, rather abruptly narrowed to an acute tip; lateral sepals oblong-obovate, 12 mm. by 8 mm., subtruncate; lower sepals 13 mm. by 6–7 mm., rather pointed; petals bluish, the upper laminae strongly oblique, 10 mm. long, 2.5 mm. wide, glabrous, bidentate, the spur 11–13 mm. long; lower laminae oblique, oblong, 5 mm. by 2.5 mm., divided almost halfway into 2 oblong lobes, subglabrous except near the central base, the claw 5 mm. long; stamens 5–6 mm. long, glabrous; anthers dark, oblong, 1 mm. long; follicles 3, divergent, glabrous, 12–13 mm. by 3 mm., the styles an additional 2.5 mm. long; seeds angled.

Caules ca. 1 m. alti, minute strigulosi, tenues, remote foliosi; folia caulium pentagono-reniformia, supra viridia, infra pallida, 6–12 cm. lata, 5-fida, segmentibus cuneato-rhombeis, incisis, dentatis; petioli 6–12 cm. longi, tenues, subglabri; inflorescentia cum 6–12 floribus, laxa, 1–2.5 dm. longa, strigulosa; bractae superiores petiolatae, lanceolatae, 10–25 mm. longae, 2–6 mm. latae; pedicelli 1–5 cm. longi; bracteolae subter florem, subspatulatae, 4–6 mm. longae; sepala purpurea vel purpureo-rubra, strigulosa, 12–13 mm. longa, 4–7 mm. lata, calcar 12–15 mm. longum, base 4.5 mm. latum; petala subcaerulea, laminae superiores obliquae, 10



mm. longae, 2.5 mm. latae, glabrae, bidentatae; laminae inferiores obliquae, oblongae, 5 mm. longae, 2.5 mm. latae, bilobatae, base barbatae, unguis 5 mm. longus; stamina glabra; antherae oblongae, 1 mm. longae; folliculi 3, divergentes, glabri, 12–13 mm. longi; styli 2.5 mm. longi; semina angulata.

TYPE: Northeastern Bhutan, Trashiyangsi, 3300 m., Aug. 28, 1934, among stones in dense jungle, *Ludlow & Sherrieff* 894 (BM); isotype, (E).

OTHER NUMBERS SEEN. Bhutan: Singhi Dzong, Khoma Chu, *Ludlow & Sherrieff* 470 (BM, E); Me La, *Ludlow & Sherrieff* 368 (BM, E); Trashiyangsi, *Ludlow & Sherrieff* 1008 (BM); Singhi Kusted, *Cooper* for *Bulley*, 4322 (BM); Bamthang, *Ludlow & Sherrieff* 16972 (BM); Rudo La, *Ludlow & Sherrieff* 20978 (BM); Dur Chu, *Ludlow & Sherrieff* 19485 (BM).

One of my great pleasures when working at the British Museum of Natural History in 1965 was to become acquainted with Mr. Frank Ludlow, whose extensive collection from the Himalaya and Tibet have been of great value in this study, and I am delighted to name this species for him! *Delphinium ludlowii* seems close to *D. altissimum*, but has more evenly toothed leaves, bracteoles nearer the flower, and sepals more minutely pubescent.

Instead of using the name *Delphinium ludlowianum* which Chowdhury wrote on some herbarium sheets in Great Britain, and which Mukerjee listed in the Bull. Bot. Surv. India 2: 293–6. 1960, without description, I feel that I should employ a different epithet. I have had no contact with Dr. Chowdhury to learn whether he wished his name published, and have been unable to ascertain his whereabouts. I am, therefore, using the name *Delphinium ludlowii* for my new species.

167. *Delphinium malabaricum* (Huth) Munz, comb. nov. FIG. 14, L.

*Delphinium dasycaulon* Fresen. var. *malabaricum* Huth, Bot. Jahrb. 20: 435. 1895.

Perennial from a woody cylindrical rhizome; stem 3–10 dm. tall, rather slender, glabrous to retrorse-pubescent below, strigose in the inflorescence, simple to few branched above, remotely few leaved; lower petioles 1–2.5 dm. long, glabrous to somewhat pubescent, strongly vaginate at base, the few cauline petioles reduced, the upper very short; lower leaf blades more or less reniform in outline, 3–10 cm. broad, glabrous or nearly so above, with few to many stiff hairs on the margin, and along veins beneath, 5- or 7-fid to 1/3 or 1/2 their length, the broad cuneate-obovate segments mostly bifid, then coarsely toothed with broad entire or toothed teeth with mucronate tips, middle cauline leaves more deeply divided, the segments entire to 3-toothed or more; inflorescence a series of 1 to few rather dense, several to many flowered racemes; lower bracts leafy, trifid, to 2 or 4 cm. long, upper linear, entire, 6–10 mm. long; pedicels divergent, 5–20 mm. long, strigose; bracteoles subulate, near middle or base of pedicel; sepals bright blue, with a white subterminal spot, strigose to subglabrous; upper



sepal ovate, 10–14 mm. long, 5–7 mm. wide, the spur subconic, 7–9 mm. long, 3–4 mm. wide at base, rather obtuse; lateral sepals elliptic-obovate, truncate-rounded at apex, 13–16 mm. long, 7–9 mm. wide; lower sepals narrowly obovate, 11–13 mm. long, 5–7 mm. wide; upper petals pale, the laminae glabrous, slightly oblique, ca. 10 mm. long, with 2 terminal round-tipped lobes ca. 2.5 mm. long, the spur 7 mm. long; lower laminae blue, round-oblong, 7 mm. by 5 mm., divided to near the base, short-ciliate and strigulose, the claw 5 mm. long; stamens 6–7 mm. long, ciliate; anthers bluish, almost round, less than 1 mm. long; follicles 3, strigulose, divergent, perhaps 10 mm. long, the styles an additional 3 mm.

TYPE: The only collection cited by Huth which is, therefore, the type, is, E. India, Malabar Concan, *Stocks*, cited from G, B, W, LE. I have seen none of these, but have seen the collections from GH and P. I suggest the Geneva specimen as the holotype, the others as isotypes.

Apparently a species of the Western Ghats in India and quite distinct from the Ethiopian *Delphinium dasycaulon* in its non villous stems, longer bracts, glabrous upper petals, etc.

MATERIAL SEEN. Khandala, *Santapau* 11551 and 11552 (MO); Purandhar, *Santapau* 13868 and 13869 (MO); Iooner, Deccan, *Stocks* (K); Bombay, *Dalzell* (K); *Ghanta* (K).

168. *Delphinium micropetalum* Finet & Gagnep. Bull. Soc. Bot. France 51: 479. 1905. FIG. 14, M.

*Delphinium micropetalum* subsp. *confusum* Choudhury ex Mukerjee, Bull. Bot. Surv. India 2: 293–296. 1960; *nomen*.

*Delphinium jugorum* Hand.-Mazz. Symb. Sinicae 7: 273. 1931. Based on *Handel-Mazzetti* 9712 from Mekong-Salwin Divide, n.w. Yunnan (W). Not seen, but the published figures are like those of *D. micropetalum*. Put into synonymy also by W. T. Wang, Acta Bot. Sinica 10: 142. 1962.

Stem striate, 4.5–10 dm. tall, simple or sparsely branched above, thick, retrorsely hirtellous, with 3–4 equally spaced leaves, or leafless above; leaves suborbicular in outline, rather stiff-strigose above and beneath, the lower cauline the largest, 11–14 cm. in diameter, trifid to 1 cm. from the base, all parts broadly rhombic-obovate, obtuse, trifid, coarsely and irregularly narrowly cuneate, dentate and incised, the teeth subovate, 1–5 mm. long and almost as wide; lower petioles 3–4 times as long as the blades, vaginate; racemes densely 8–13-flowered, those on the branches reduced, the axis white-strigose and with yellow glandular hairs; lower bracts foliaceous, petioled, dilated at base, 3–5-lobed, 1–2 cm. long; the others oblong-lanceolate, entire; pedicels 1.5–5 cm. long, divergent; bracteoles puberulent, lance-linear, 10–12 mm. long, just below the flower; sepals intensely blue, upper sepal ovate, 14 mm. by 8 mm., the spur 12–14 mm. long, 3.5 mm. wide at the base; lateral sepals oblong, 16 mm. by 8 mm., subtruncate; lower sepals asymmetrically obovate, 18 mm. by 12 mm., broad at apex; lamina of upper petals yellowish, at right angles to the



spur, 9 mm. long, 3.5 mm. wide, obtuse or emarginate, the spur 12 mm. long; lower laminae 5 mm. by 3 mm., oblique, oblong, bifid one-fourth its length, the lobes obtuse, short hairy below the middle, claw 6.5 mm. long; stamens 6–7 mm. long, glabrous; anthers dark, oblong; carpels 3, puberulent, to 10 mm. long, the style an additional 3 mm.

TYPE: Western Yunnan, Tsé-Kou, April 1895, *Soulié 1098* (P); seen.

SPECIMENS SEEN. 3300–4400 m. Southeastern Tibet: *Rock 22401, 22402, 22373*. Yunnan: *Yü 20783, 20639, 20369, 22320; Forrest 221; Tsai 58069*. Burma: Chawchi Pass, *Farrer 1867, 1156; Forrest 27516, 27225, 25091; Lepcha 865*.

169. *Delphinium mitzugense* Ulbr. Notizbl. Bot. Gart. Berlin 12: 358. 1935. FIG. 15, A.

*Delphinium taliense* Franch. var. *glabrum* W. T. Wang, Acta Bot. Sinica 10: 159. 1962. Based on same type as *D. mitzugense*.

? *Delphinium taliense* var. *pubipes* Wang, loc. cit. I have not seen cited material.

Stem 10–12 dm. high, erect, stout, glabrous and glaucous below with some red, more or less bluish and glaucous above, branched above, with few remote leaves; basal leaves gone by anthesis, the lower cauline with petioles 1.5–2 dm. long, stout, glabrous, vaginate, the upper shorter and more slender; blades rounded in outline, the lower 10–13 cm. in diameter, scattered-strigose above and beneath, paler beneath, palmately 7-fid to 1 cm. or less from the base, the segments subcuneate-obovate, mostly 3-lobed distally, each lobe divided into 2–3 smaller, oblong, acute to obtuse mucronulate divisions 2–5 mm. wide, the uppermost leaves divided into 5 lanceolate entire segments; inflorescence few branched, paniculate, glabrous, lax; bracts subulate, 8–15 mm. long, bluish; pedicels slender, ascending, 2–5 cm. long, blue; bracteoles subulate, 5–8 mm. long, placed near the middle of the pedicel; sepals blue, somewhat strigulose; the upper sepal ovate, 13–15 mm. long, 7 mm. wide, obtuse, the spur horizontal-decurved, 20–25 mm. long, 4 mm. wide at base, subcylindric, the tip ca. 1.5 mm. wide; lateral sepals 15 mm. long, 8 mm. wide, rounded-truncate, strigose on median nerve; lower sepals subelliptic, 14 mm. long, 6 mm. wide, obtuse; petals bluish, the upper laminae slightly oblique, spatulate, erose, 9 mm. long, the spur 20 mm. long; lower laminae oblique, oblong-obovate, 7–8 mm. long, deeply cleft into lance-oblong lobes, yellow-bearded at base of lamina, the remainder with long white hairs and ciliate, claw 5 mm. long; stamens 4–6 mm. long, moderately dilated below, glabrous; anthers bluish, 1 mm. long; carpels 3, pilose.

TYPE: Southwestern Szechwan, Muli, Mt. Mitzuga, 4300 m., *J. F. Rock 18317*, holotype (B?), not seen; isotypes (GH, US), seen.

Another collection is Szechwan, Huei-li Hsien, *T. T. Yü 1598* (GH). Since Wang reduced *D. mitzugense* to varietal status under *D. taliense*, he must have considered the two very close, but the latter has a much wider lamina of the lower petal, and an emarginate upper petal.



170. *Delphinium muliense* W. T. Wang, Acta Phytotax. Sinica 6: 365. 1957. FIG. 15, B.

*Delphinium pachycentrum* Hemsl. var. *tenuicaule* Chen, Bull. Fan Mem. Inst. Biol. Peiping (n.s.) 1: 168. 1948. Type, T. T. Yü 6989, 3300 m., Muli, Kulu (PE?); not seen. Reduced to synonymy of his new species (*D. muliense*) by W. T. Wang, Acta Bot. Sinica 10: 149. 1962.

*Delphinium muliense* var. *minutibracteolatum* W. T. Wang, Acta Bot. Sinica 10: 149. 1962. Based on T. T. Yü 14371, which I have not seen, but the separation because of reduced bracteoles hardly seems well founded.

Perennial, 6–7 dm. tall, striate, subglabrous, slender, simple or with short sterile branches, equably leafy; basal leaves lacking at anthesis; cauline laminae pentagonal, cordate, 2.5–5.5 cm. long, 4–7 cm. wide, 3-sect, the central segment rhombic, petiolulate, trifid to its middle, lateral segments 2-parted, bifid to trifid, all parts incised into dentate lobes, strigose above, pubescent beneath on nerves; petioles 4–15 cm. long, glabrous, somewhat vaginate; raceme few to many flowered, 6–20 cm. long, retrorsely white-hairy and yellow-glandular; lower bracts leaflike, but smaller, upper lanceolate to linear, 8–14 mm. long; pedicels erect-spreading, 1–5 cm. long; bracteoles in upper third of pedicel, lanceolate to linear, 5–13 mm. long, 1–2 mm. wide; flowers bluish-purple to yellowish, the upper sepal obovate, cymbiform, 12–15 mm. long, the spur somewhat decurved, 20–25 mm. long; other sepals oblong-obovate, obtuse, 14–18 mm. long; petals bluish, the upper laminae ca. 8 mm. long, obliquely truncate, glabrous to pubescent, entire, spur 15–20 mm. long; lower laminae 5–6 mm. long, ovate, yellow bearded near base, bifid to below the middle with oblong triangular lobes strigose and ciliate, claw 4.5–5.5 mm. long, appendiculate; stamens glabrous; carpels puberulent on sutures.

TYPE: Szechwan, Muli, Ha-lin, 3500 m., July 11, 1937, T. T. Yü 6989?, published as 6988 (PE, A), photo. (A); photo. and isotype seen.

EXAMPLES. Seemingly agreeing with the type, Muli, Rock 16916. Tibet: Yigrong Gorge, 3300 m., Kingdon Ward 12190; Kongbo Prov., Ludlow, Sherriff & Taylor 6920; Tsanpo Valley, Ludlow, Sherriff & Taylor 5397; Lochen La, Kingdon Ward 12240; Shweli-Salwin Divide, Forrest 11792.

171. *Delphinium orthocentrum* Franchet, Bull. Soc. Philom. Paris VIII. 5: 178. 1893. FIG. 15, C.

*Delphinium szechuanicum* Ulbr. Repert. Sp. Nov. 14: 298. 1916. Type, West Szechwan, E. H. Wilson 1088 (B?) not seen; isotypes (GH, US), seen.

Perennial from a woody root, the stem glabrous below, erect, simple, leafy throughout, 5–10 dm. tall, grayish in inflorescence with appressed short hairs; petioles to 1 dm. or more long, somewhat dilated at base; laminae of leaves somewhat strigulose on both sides, 1 dm. or more in diameter, deeply 5-parted, the segments broadly obovate-rhombic, broad at base, unequally incised into acute lobes, the terminal one elongate; inflorescence a rather crowded raceme with perhaps 8–20 flowers; bracts





FIGURE 15. *Delphinium*, GROUP VIII. Petals, the upper spurred, the lower clawed. A. *D. mizugense*; blade of upper petal 9 mm. long, spur 20 mm.; blade of lower petal 7 mm. long, claw 5 mm.; drawn from *Rock 18317* (US). B. *D. muliense*; blade of upper petal 8 mm. long, spur 15 mm.; blade of lower petal 5 mm. long, claw 4 mm.; drawn from *Kingdon Ward 12190* (BM). C. *D. orthocentrum*; blade of upper petal 10 mm. long, spur 11 mm.; blade of lower petal 7 mm. long, claw 6 mm.; drawn from *Harry Smith 3541* (A). D. *D. osseticum*; blade of upper petal 9 mm. long, spur 10 mm.; blade of lower petal 6 mm. long, claw 4.5 mm.; drawn from *Busch* TYPE (LE). E. *D. pachycentrum*; blade of upper petal 11 mm. long, spur 16 mm.; blade of lower petal 6 mm. long, claw 6 mm.; drawn from *Pratt 462* ISOTYPE (BM). F. *D. pogonanthum*; blade of upper petal 10 mm. long, spur 25 mm.; blade of lower petal 6 mm. long, claw 6 mm.; drawn from *Feng 2115* (A). G. *D. scabriflorum*; blade of upper petal 12 mm. long, spur 15 mm.; blade of lower petal 10 mm. long, claw 6 mm.; drawn from *Ludlow & Sherriff 3342* (BM). H. *D. sherriffii*; blade of upper



all foliaceous, lanceolate to linear, entire or few toothed, 1–5 cm. long; pedicels erect, pubescent, 2–4 cm. long; bracteoles 2–3, linear, placed from just below the flowers to near the middle of the pedicel, 10–15 mm. long; sepals blue-violet, pubescent, the upper one oblong-ovate, 15 mm. long, 6 mm. wide, obtuse, the spur erect, obtuse, 12–16 mm. long, 3.5 mm. thick at the base; lateral sepals 13 mm. by 7 mm., oblong-elliptic, pubescent along midrib, obtuse; lower sepals 15 mm. by 7 mm., pointed, pubescent; upper petals bluish, the laminae 10 mm. long, almost straight, unequally bidentate at apex, the spur thick at base, recurved, narrow at tip; lower petals bluish, the claw 6 mm. long, the bearded lamina oblong, 7 mm. long, divided ca. 4.5 mm. into lance-oblong segments; stamens 7–8 mm. long; anthers dark, 1 mm. long; follicles 3, sparsely silky.

TYPE: Szechwan, in western part, *Potanin* in 1885 (P); seen.

REPRESENTATIVE MATERIAL. Szechwan: *H. Smith* 4200, 3541; *E. H. Wilson* 3093; *W. P. Fang* 4037, 4038, 1083.

172. *Delphinium osseticum* N. Busch, Bull. Acad. Sci. U.S.S.R. 7: 449. 1931. FIG. 15, D.

Stem ca. 1 m. tall, more or less muricate-roughened to bristly with white spreading hairs, leafy; petioles thickly hairy, not vaginate at base; leaf blades to 1.5 dm. in diameter, deeply 5-fid into rather narrow segments, densely and softly hairy, especially on the upper surface, more or less appressed underneath where the hairs along the veins are longer, the blades pinnately shallowly lacinate or serrulate into lanceolate teeth or lobes 2–5 mm. wide, 4–15 mm. long; inflorescence rather a dense raceme, 2–5 dm. long, branched, with soft pubescence; middle and upper bracts entire, lanceolate, hairy, bluish, 15–25 mm. long; pedicels ascending or erect, 1–4 cm. long; bracteoles densely white-hairy on the back and edge, ovate, ovate-elliptic or ovate-lanceolate, acuminate, usually 7–10 mm. long, 3–5.5 mm. broad, bluish, located near the flower; sepals blue, the upper membranous, strongly veined, with long white hairs, strongly cu-

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petal 9 mm. long, spur 20 mm.; blade of lower petal 6 mm. long, claw 5 mm.; drawn from *Ludlow & Sherriff* 5833 TYPE (BM). I. *D. siamense*; blade of upper petal 11 mm. long, spur 18 mm.; blade of lower petal 6 mm. long, claw 6 mm.; drawn from *Kerr* 6612, ISOTYPE (BM). J. *D. sparsiflorum*; blade of upper petal 10 mm. long, spur 7.5 mm.; blade of lower petal 4 mm. long, claw 5 mm.; drawn from *Rock* 13191 (GH). K. *D. taliense*; blade of upper petal 9 mm. long, spur 22 mm.; blade of lower petal 7 mm. long, claw 5 mm.; drawn from *Bodinier & Ducloux* 370 (P). L. *D. ternatum*; blade of upper petal 10 mm. long, spur 15 mm.; blade of lower petal 6.5 mm. long, claw 5.5 mm.; drawn from *Regel* at Hissar (LE). M. *D. trifoliolatum*; blade of upper petal 10 mm. long, spur 20 mm.; blade of lower petal 7 mm. long, claw 6 mm.; drawn from *Henry* 7448 (GH). N. *D. umbrosum*; blade of upper petal 8 mm. long, spur 24 mm.; blade of lower petal 6 mm. long, claw 5 mm.; drawn from *Wang* 69052 (A). O. *D. uralense*; blade of upper petal 10 mm. long, spur 13 mm.; blade of lower petal 5 mm. long, claw 5 mm.; drawn from *Litwinow* TYPE (LE).



cullate, 12 mm. long, 7 mm. wide, the spur 13 mm. long, 4 mm. wide at base, straight; lateral sepals 12 mm. by 8 mm., rounded-obovate; lower cucullate, 12 mm. by 5 mm.; petals pale, the upper laminae slightly oblique, 9 mm. long, emarginate, glabrous, the spur 10 mm. long; lower laminae slightly oblique, ovate, 6 mm. by 5 mm., bifid halfway into 2 round-oblong ciliate lobes, the claw broad, 4.5 mm. long; stamens 6–7 mm. long, glabrous; anthers dark, 1.5 mm. long; carpels 3, glabrous.

TYPE: Upper borders of forest, Caucasus, eastern cis-Caucasus (Ossetia), at 1800 m., July 23, 1930, *Busch* (LE), seen.

ILLUSTRATION. Bull. Acad. Sci. U.S.S.R. 7: 451. 1931.

173. *Delphinium pachycentrum* Hemsl. Jour. Linn. Soc. Bot. 29: 301. 1892. FIG. 15, E.

*Delphinium pachycentrum* subsp. *hemsleyi* Brühl ex Brühl & King, Ann. Bot. Gard. Calc. 5: 108. 1896.

*Delphinium pachycentrum* var. *lobatum* W. T. Wang, Acta Bot. Sinica 10: 140. 1962.

*Delphinium sertiferum* Franchet, Bull. Soc. Philom. Paris VIII. 5: 171. 1893. Type, Tatsienlu, Szechwan, *R. P. Soulié* 24 (P); seen.

Perennial from a thick woody root, stem simple except at summit, 4–6 mm. thick, 3–4 dm. tall, leafy throughout; petioles slender, slightly dilated at base, strigulose, 3–10 cm. long; leaf blades divided almost to base into 3 or 5 segments (the 2 lateral then divided almost to base), rounded-pentagonal in outline, 3–10 cm. in diameter, ultimately shallowly incised or toothed, the teeth oblong-ovate or deltoid, acute; inflorescence close-pubescent, somewhat corymbiform, the lower pedicels elongate, solitary or on short suberect branches, the upper 1–5 cm. long; lower bracts reduced foliage leaves, the upper smaller; bractlets linear, 5–8 mm. long, near the flower; sepals pale blue, densely appressed-pubescent; upper sepal 14–16 mm. long, 9–10 mm. wide, ovate, acutish, the spur straight, 18–22 mm. long, 3–3.5 mm. wide at base, only slightly narrowed to a blunt end; lateral sepals 14–16 mm. long, 6–8 mm. wide, oblong-ovate, obtuse, pubescent on whole outer surface; lower sepals slightly longer, oblong; laminae of upper petals whitish yellow, straight, 13–14 mm. long, rounded and entire at apex, the spur 20–22 mm. long; lower laminae blue, almost round, 9–10 mm. long, divided 1–2 mm., hirsute at base, sparsely so otherwise, claw 8 mm. long, ciliate; stamens 7–8 mm. long, glabrous; anthers dark, 1.4 mm. long; follicles 3, densely yellow-hairy, 10–12 mm. long, 3–4 mm. wide, erect, the styles an additional 2 mm.; seeds rounded, hyaline-alate.

TYPE: Szechwan, near Ta-tsien-lou, *Pratt* 462 (K), isotypes (BM, CAL, P); all seen.

OTHER COLLECTIONS. Tatsienlu, *Soulié* 2379 (K, P); *Harry Smith* 11051 (A, MO, NY); Mt. Konka, Konkaling, *Rock* 16884 (P).



174. *Delphinium pogonanthum* Hand.-Mazz. Symb. Sinicae 7: 279. 1931. FIG. 15, F.

Stems 1–2, fistulose, 5–8 dm. tall, scattered-bristly with stiff white hairs, remotely few leaved; lower petioles 1–2 dm. long, bristly hairy, the bases broadly sheathing, upper petioles short; leaf blades broadly cordate-rounded in outline, to 1 dm. across, with scattered appressed stiff hairs, trifid to ca. 1 cm. from the base, the two lateral divisions deeply cut so as to make 5 divisions, these broadly cuneate-obovate, coarsely and deeply toothed distally, the teeth 3–8 mm. long, 3–4 mm. wide, subacute; upper leaves reduced, then passing into trifid foliose bracts 15–25 mm. long, upper bracts linear-lanceolate, entire, hairy, ca. 10 mm. long; inflorescence a lax raceme to 3.5 dm. long, or with 1–2 short racemose branches below; the axis and pedicels with spreading and retrorse, coarse, hyaline, white or yellow hairs to almost 1 mm. long; pedicels ascending, 1–5 cm. long; bracteoles 2, erect, broadly linear, 6–10 mm. long, near to or somewhat below the flower; sepals dark blue, stiff-pubescent; upper sepal broadly ovate, 13 mm. long, 10 mm. wide, obtuse, the spur horizontal, slightly decurved, ca. 20 mm. long; 3 mm. wide at the base, narrowed to a long tapering apex; lateral sepals asymmetrically elliptic-oblong, 12 mm. by 6 mm., pubescent along the midline, rounded at apex; lower sepals more pubescent, 12 mm. long, 4 mm. wide, rounded at apex; upper petal laminae bluish, almost straight, entire, glabrous, 9 mm. long, the spur 19 mm. long; lower laminae oblong, oblique, 7 mm. long, 2 mm. wide, bearded near base, long-ciliate the apex unequally shallowly 2-lobed; stamens 6–7 mm. long, glabrous; anthers dark, linear-oblong, 1.3 mm. long; follicles 3, pubescent, 10 mm. long, the style an additional 3 mm.; immature seeds with transverse tiers of scales.

TYPE: N. W. Yunnan, 3600–4025 m., southeast of Dschungdien, between Peti and Alo, Aug., 1914, no. 4576, *Handel-Mazzetti?* (w?), not seen. In the original description there is a figure on p. 281 which is helpful.

Specimens to be referred here: Yunnan: *H. T. Tsai* 57615 (A); Konkaling, Muli, 3600 m. *T. T. Yü* 13270 (A, BM, E); Muli, Kulu, 3300 m., *Yü* 14367 (BM, E); Haba Snow Range, *K. M. Feng* 2115 (A); S. Chungtien, *Feng* 1836 (A).

175. *Delphinium pseudo-campylocentrum* W. T. Wang, Acta Bot. Sinica 10: 150. 1962.

*Delphinium hirticaule* Franchet var. *mollipes* Wang, Acta Bot. Sinica 10: 146. 1962. Based on *K. H. Yang* 58941, from Wu-hsi, Szechwan, isotype (E), seen.

Root elongate, 2–5 mm. in diameter; stem ca. 4 dm. high, 4 mm. thick at base, spreading-hirsute below, glabrous above, simple or few branched above, equally foliose throughout; lower cauline leaves with broadly pentagonal blades 4–4.5 cm. long, 4.5–6.5 cm. wide, cordate at base, trisect, the middle segment 3-parted to below the middle, the lateral segments



broader than the middle, 2-parted for three-fourths their length, all parts few lobuled, strigulose especially above; petioles 4.5–5.5 cm. long, not vaginate, hirsute; upper cauline leaves gradually reduced; racemes 4–9-flowered, lower bracts leaflike, 2–4 cm. long, others linear to subulate, 3–10 mm. long; pedicels 2–4 cm. long, divergent, slightly incurved, bracteolate above the middle, loosely yellow glandular-puberulent; bracteoles oblong-linear to subulate, 2–6.5 mm. long, loosely strigulose; sepals deep blue, narrowly elliptic or broadly lanceolate, 11–15 mm. long, minutely puberulent on both surfaces, the spur 17–22 mm. long, subulate, slightly decurved at apex; upper petals blue, glabrous; lower petals blue, the limb ovate, bilobed one-third to one-half the length, ciliate, yellow bearded at base; stamens glabrous; carpels 3, loosely puberulent.

TYPE: Szechwan, Tachin, 4400 m., Aug. 5, 1958, *H. Li* 78358 (PE), not seen; photo. at (E) seen.

The only specimen I have seen is the one mentioned above as isotype of *D. hirticaule* var. *mollipes*.

176. *Delphinium scabriflorum* D. Don, Mem. Wernerian Soc. 3: 412. 1821. FIG. 15, G.

*Delphinium carela* Buch.-Ham. ex D. Don, Prod. Fl. Nepal. 195. 1825. New name for *D. scabriflorum*.

Perennial from rather a woody root; stem 6–12 dm. or more tall, rather slender, terete, more or less spreading-hairy throughout or at least above, scattered-leafy; leaves pentagonal, the blades of the lower 5–15 cm. wide, open-cordate, 5-fid to near the base or 1–2 cm. above, the segments sub-cuneate below, stiff-pubescent on both sides, but especially on nerves beneath, the segments incised-lobed then coarsely toothed, the lobules oblong-ovate, 2–5 or more mm. wide; petioles hairy, 1–2 dm. long, scarcely vaginate at the base; upper leaves gradually reduced; central raceme open, 8–12-flowered, with fewer-flowered branches from below; inflorescence densely short-hairy, some of the hairs glandular; lower bracts foliose, divided, to 3 cm. long, the upper simple, entire, linear to lanceolate, 1–2 cm. long; pedicels arched-spreading, densely pubescent, 1–5 cm. long; bracteoles linear, to lanceolate, 5–10 mm. long, subtending the flower; sepals blue to rich blue-violet, with rather stiff appressed hairs, the upper sepal round-ovate, 15 mm. long, 10 mm. wide, subacute, the spur 18 mm. long, 3 mm. wide at base; lateral sepals oblong-obovate, 13 mm. long, 7 mm. wide, obtuse; lower asymmetrically obovate, 15 mm. long, 8 mm. wide; petals blue, the upper laminae oblique, 12 mm. long, 3 mm. wide, glabrous, bidentate, the spur 15–16 mm. long; lower laminae oblong, 10 mm. long, 3.5 mm. wide, bifid into 2 unequal lance-oblong lobes, white-ciliate, the claw 6 mm. long, bearded; stamens 6–7 mm. long; anthers elongate, 1.5 mm. long; follicles 3, subglabrous.

TYPE: "Alpibus Nepaliae," *D. Wallich*; not seen.



RANGE. Growing on open or wooded, often somewhat rocky hillsides, mostly in Bhutan.

COLLECTIONS SEEN. Ridang near Trongsa, 2200 m., *Ludlow & Sherriff* 219 (BM); valley of Khano Chu Kurted, *Cooper & Bulley* 4223 (BM); Chandesi, 2500 m., *Ludlow & Sherriff* 3342 (BM); Yatola ridge, Trongsa, 3200 m., *Cooper & Bulley* 4114 (BM). A specimen from Burma, Chimili woods, R.A., Aug. 21, 1919 (E) is near the above.

✓177. *Delphinium sherriffii* Munz, sp. nov.

FIG. 15, H.

Perennial, the stem 10–16 dm. tall, 7–8 mm. thick, with short white spreading pubescence, simple below, short branched above, rather equably but not densely leafy; cauline petioles pubescent, slender, 6–10 cm. long, slightly dilated at the base; cauline leaves to ca. 1 dm. across, 5-fid to 1 cm. or less from the base, pubescent chiefly along the veins, the segments rather broadly cuneate-rhombic, 2–3-lobed to about the middle, then sharply incised into few lanceolate or lance-ovate teeth mostly 3–5 mm. broad, mucronate; inflorescence with several short branches, thus forming a rather diffuse but compact panicle, the axes with short, spreading, yellow, glandular hairs; lower bracts divided, but mostly simple, filiform, 5–7 mm. long; pedicels spreading, 2–4 cm. long, glandular-pubescent; bracteoles filiform, 2–3 mm. long, near or above the middle of the pedicel; flowers few to several on each branch of the inflorescence, not crowded; sepals somewhat strigulose, bright bluish purple, the spur dark wine-red; upper sepal 12 mm. by 5 mm., broad-ovate, apiculate, the spur spreading decurved, 20–22 mm. long, 4–5 mm. wide at base, rapidly narrowed; lateral sepals 12 mm. long, 4.5 mm. wide, rounded-obtuse at apex; lower sepals 12 mm. long, 4 mm. wide, more apiculate; petals pale, the upper laminae strongly oblique, 8–9 mm. long, 4 mm. wide, glabrous, emarginate, the spur 20 mm. long; lower laminae 6 mm. long, divided two-thirds their length into lance-oblong ciliate lobes, claw appendiculate, 5 mm. long; stamens 5–6 mm. long; anthers dull slaty green; carpels 3, strigulose.

Caulis 10–16 dm. altus, 7–8 mm. crassus, pubescens, supra breve ramosus, foliosus; petioli caulium 6–10 cm. longi, base dilatati, pubescentes; folia caulium 6–10 cm. lata, 5-fida, praesertim in venis pubescentia, segmenta foliorum cuneato-rhombea, 2–3-lobata, tum incisa lobulis paucis lanceolatis vel lanceo-ovatis; inflorescentia ramosa, axes aureo-glandulosi; bracteae infimae divisae, aliae integrae, filiformes, 5–7 mm. longae; pedicelli divaricati, 2–4 cm. longi, glanduloso-pubescentes; bracteolae filiformes, 2–3 mm. longae; flores pauci vel plures; sepala strigulosa, caeruleo-purpurea, 12 mm. longa, calcar 20–22 mm. longum, base 4–5 mm. crassum; petala pallida, laminae superiores obliquae, 9 mm. longae, glabrae, emarginatae; laminae inferiores 6 mm. longae cum 2 lobis lanceo-oblongis ciliatisque; unguis 5 mm. longus appendiculatus; stamina 6 mm. longa; antherae subviridia; carpella 3, strigulosa.

TYPE: Southeastern Tibet, Tsanang La, 3200 m., July 15, 1938, *Ludlow*



& Sherriff 5833 (BM), growing in clearings in mixed forest. Characterized by its small flowers in a branched compact, but not dense, inflorescence. Mr. Sherriff's collections, largely made with Mr. Ludlow, have been of great help in the preparation of this paper.

178. *Delphinium siamense* (Craib) Munz, comb. nov. FIG. 15, I.

*Delphinium stapeliosum* Brühl var. *siamense* Craib, *Florae Siamensis Enumeratio* 1: 19. 1925.

Stem slender, 3–5 dm. tall, few branched above, scattered-leafy, with a few spreading white hairs below, strigulose upward, often quite loosely so; lower petioles slender, 1–2.5 dm. long, vaginate, with scattered white hairs, the upper petioles shorter; blades mostly round-pentagonal in outline, cordate at base, 3–7 cm. long, 4–10 cm. wide, divided halfway or farther with sharply acute sinuses and broad cuneate-rhombic segments, sparingly strigose above, glabrous beneath except on the veins, the segments shallowly but sharply trilobed then incised with lobules or few teeth triangular-lanceolate or broader (2–6 mm. wide), acute to acuminate, mucronate; upper leaves reduced; inflorescence of a few slender-stemmed racemes (the central 4–6–8-flowered), these loosely strigose; lowest bract trifid or entire, the upper lance-linear, 10–15 mm. long; pedicels mostly 1–2 cm. long, ascending; bracteoles linear, 5–7 mm. long, at or below the middle of the pedicel; flowers light blue, the sepals strigose, the upper round-ovate, 14 mm. long, 9 mm. wide, obtuse, the spur straight, 3.5 mm. wide at base, 16–18 mm. long, tapered very gradually to a blunt tip; lateral sepals round-obovate, 13–14 mm. long, 12 mm. wide, rounded at apex; lower sepals obovate, 14 mm. long, 8 mm. wide, obtuse; petals pale, the upper laminae somewhat oblique, 11 mm. by 5 mm., glabrous, strongly bidentate at apex, the spur 17–18 mm. long; lower laminae more or less obovate, 6 mm. by 4 mm., bearded, deeply bifid into broad oblong lobes, the claw 6 mm. long; stamens 6–7 mm. long, glabrous, the darkish anthers 1 mm. long; carpels 3, strigose.

TYPE: Siam, Doi Chiengdao, 2100 m., open rocky ground, *Kerr* 6612 (K, BM); seen.

OTHER COLLECTIONS: Doi Chiengdao, *Put* 337, Herb. A. F. G. Kerr (BM, K), 4454 (BM, K); Doi Pa Mawn, 1510 m., *H. B. G. Garrett* 452 (K).

179. *Delphinium sparsiflorum* Maxim. Bull. Acad. Pétersb. 23: 307. 1877. FIG. 15, J.

Perennial, the rather coarse stem 10–15 dm. tall, subglabrous, rather equably leafy in lower half, the petioles scarcely dilated at base, slender, to ca. 1 dm. long; leaf blades sparsely strigose, paler beneath, to ca. 1.5 dm. in diameter, ternate, then the 2 lateral parts divided nearly or quite to the base, they and the central one with cuneate base and incisely pinnately lobed, each lobe with few large, mucronate, lanceolate or ovate teeth or lobules; flowers scattered in an open diffuse panicle forming the whole upper



part of the plant; lower bracts foliaceous, more or less coarsely incisely lobed, 1–3 cm. long, the upper subulate, entire, 2–4 mm. long; pedicels filiform, glabrous, 2–4 cm. long; bracteoles alternate or paired, ca. 2 mm. long; flowers pale blue, the upper sepal broadly ovate, 9 mm. long, 8 mm. wide, subglabrous except for a very minute puberulence about the obtuse apex; spur conical, ca. 7 mm. long, 3.5 mm. wide at base; lateral sepals 10–11 mm. long, 6–7 mm. wide, glabrous except at the tip; lower sepals 10–11 mm. long, 4–5 mm. wide, also minutely puberulent at apex; laminae of upper petals 8–9 mm. long, pale, suboblong, glabrous; lower laminae pilose, 7 mm. long, the blade bifid, 4 mm. long, the claw ciliate; stamens ca. 4 mm. long, glabrous; anthers dark, 1 mm. long; follicles 3, sparsely pilose, to ca. 12 mm. long, 3 mm. wide, the styles an additional 2 mm.

TYPE: Kansu, China; Terra Tangutorum, *Przewalski*, 1872 (LE), seen. Huth says this region is Tangutica at River Tetung, 2600 m.

ILLUSTRATION. MAXIMOWICZ, *Fl. Tangut.* pl. 5. 1889.

The only collection I have seen in addition to the type is from southwestern Kansu, Tao River Basin, at 3000 m., *Rock 13191* (GH).

180. *Delphinium sungpanense* W. T. Wang, *Acta Bot. Sinica* 10: 149. 1962.

Stem about 9 dm. tall, 2 mm. thick, smooth, glabrous below inflorescence, equably leafy; middle cauline leaves with rather long petioles, the blades broadly pentagonal, 6 cm. long, 10 cm. wide, trisect, the middle segment rhombic, long-acuminate, cuneate at base, trifid to middle, the middle lobe narrow-rhombic or lance-rhombic, with 1 lobule on each side below the middle, the lateral lobes triangular-ovate or obliquely ovate; lateral segments broadly rhombic, parted and lobed as in the middle segment; blades subglabrous below, strigulose above; racemes ca. 15 cm. long, lax, about 8-flowered; lower bracts trisect or linear, 4.5–5 cm. long, others linear, shorter; pedicels 1.5–5 cm. long, strigulose, bibracteolate above; bracteoles remote from the flower, linear, 5–7 mm. long, glabrous; sepals purple-blue, oblong-obovate, 8 mm. long, strigulose, short-corniculate, the spur 19–22 mm. long, 2.5 mm. wide at base, decurved into a right angle; upper petal laminae yellowish, entire, glabrous; lower blue, subequal to sepals, ovate, bifid to middle into lance-triangular lobes, ciliate, yellow bearded near middle, claw shorter than limb, appendiculate; stamens glabrous; carpels 3, glabrous.

TYPE: Sungpan, Szechwan, *W. P. Fang 4038* (PE?); not seen.

Said to be near *D. giraldii*, but racemose, the axes and pedicels densely puberulent, and the spur decurved into a right angle.

181. *Delphinium taliense* Franchet, *Bull. Soc. Philom. Paris* VIII. 5: 174. 1893. FIG. 15, K.

Stem robust, to 1 m. and more in height, much branched from base, glabrous and glaucous; leaves numerous and finely pubescent, with petioles



8–12 cm. long and somewhat dilated at base, the blades 5–10 cm. wide, deeply divided in the lower leaves into 3 broad segments, these cuneate-obovate, trifid, incised, then shallowly lobed, the ultimate teeth few, broadly ovate, mucronate, 5–15 mm. long, 5–12 mm. broad; the divisions of the upper leaves lanceolate, subentire or few lobed; branches of inflorescence elongate, arched, with an entire linear leaf at the base; bracts linear-setaceous, 8–10 mm. long; pedicels 2–4 cm. long; bracteoles setaceous, minute, placed a little below the flower; sepals puberulent, blue with a whitish band on the back, 15–20 mm. long, obtuse to rounded, spur straight or slightly curved, 22–25 mm. long, 3 mm. wide at the base; upper petals bluish to whitish, the laminae slightly oblique, 9 mm. long, glabrous, deeply emarginate, the spur ca. 21 mm. long; lower laminae sometimes white, deeply bilobed, yellow bearded near base, ciliate, round-obovate, 7 mm. long, the claw 5 mm. long, appendiculate; follicles 3, glabrous; seeds black, pyramidal, truncate, somewhat rugulose, winged on angles.

TYPE: Yunnan, Mt. Pen-gay-tzé, below Tali, *Delavay* 9 (P), seen.

OTHER COLLECTIONS. Yunnan: *Bodinier & Ducloux* 379 (P); *Delavay*, Sept. 22, 1887, at 2000 m. (P).

This species, *Delphinium taliense*, suggests *D. yunnanense* in the long segments of its upper leaves. It has stem leaves like those of *D. exaltatum*, and has been confused with *D. elatum*, which has the spur equal to the sepals, and almost black petals.

182. *Delphinium ternatum* Huth, Bot. Jahrb. 20: 421. 1895.

FIG. 15, L.

Perennial, 5–10 dm. tall, erect, soft-pubescent, the petioles to 1 dm. long, scarcely dilate at the base, the leaf blades 4–8 cm. broad, glabrescent on both surfaces, ciliate on margins, ternate, the leaflets deeply tripartite, the parts entire or sparsely serrate-incised, subsessile, cuneate, the final lobules lanceolate, somewhat acuminate, to 3 cm. long; inflorescence branched, the racemes lax, glabrous; bracts linear, 5 mm. long; pedicels 1–2 cm. long in fruit, divergent, shorter in flower; bracteoles linear, at about the middle of the pedicel, 2–3 mm. long; flowers blue, the sepals round-ovate, glabrous, the upper 12 mm. by 5 mm., subacute, the spur 15 mm. long; lateral sepals elliptic, rounded-obtuse, 13 mm. by 5 mm.; lower sepals more pointed; upper petals yellowish with bluish tinge, the laminae oblique, 10 mm. long, bidentate, the spur 15 mm. long; the lower laminae bluish, deeply divided, sparsely white-bearded, 6.5 mm. by 4 mm., the claw 5.5 mm.; anthers yellow; follicles 3, hirsute; seeds squamate, the scales contiguous.

TYPE: Huth cited two specimens from Bucharra: (1) Darwas, Omar ad fluvii Pänsch ripam sinistram, *Regel*, 1882 (LE) and (2) distr. Hissar, mts. near Hakimi in valley of R. Karatag, *Regel*, 1882 at 1600–2300 m. (LE). Both seen; I would take the Hissar specimen collected by *Regel* as lectotype since it has more leaves intact than his other collection.



Apparently belonging here is Mt. Kuhitang, eastern Turcomania, July 14, 1931, *S. Nevski* 790 (K).

183. *Delphinium trifoliolatum* Finet & Gagnep. Bull. Soc. Bot. France 51: 481. plate 6A, figs. 1-6. 1904. FIG. 15, M.

Perennial from a short thick root; stem slender, subflexuous, striate, simple or branched above, 3-7 dm. tall, more or less strigulose throughout, densely so in the inflorescence, leafy throughout, the leaves rather remote; petioles very slender, 3-10 cm. long, somewhat inflated at the base; the blades round-pentagonal in outline, strigose to strigulose on both surfaces, especially along the veins, 4-10 cm. in diameter, trifid to the base, the lateral segments bifid almost to the base, all 5 segments thus formed more or less petiolulate, lance-ovate, narrow-cuneate at base, 1-2 cm. wide, shallowly incised or unequally sharply dentate into acute teeth 2-4 mm. long; upper leaves somewhat reduced and passing into trifoliolate bracts 5-20 mm. long; racemes lax, rather few flowered, the pedicels strigose, 5-30 mm. long, very slender, divergent; bracteoles lance-oblong, 3-8 mm. long, near the summit of the pedicel; flowers pale blue, sepals strigulose, yellowish near the apex; upper sepal ovate, 10 mm. long, 6 mm. wide, subobtuse, the spur 18-20 mm. long, 2.5 mm. wide at base, somewhat curved toward the narrow tip; lateral sepals oblong, 10 mm. by 5 mm., rounded at apex, pubescent along midline; lower sepals 12 mm. by 7 mm., more pointed, more pubescent; laminae of upper petals pale, slightly oblique, 10 mm. long, bidentate at the acute apex, glabrous, the spur 20 mm. long; lower laminae bluish, oblong, 7 mm. long, 3 mm. wide, sparsely bearded, cleft to below the middle into lance-oblong lobes; stamens 5 mm. long, glabrous; anthers dark, 1.5 mm. long; follicles 3, glabrous or nearly so, 5 mm. long, the styles 1-2 mm. more.

TYPE: Hupeh, China, *E. H. Wilson* 2496, published as 3496, July, 1901, holotype (P) seen; isotypes (E, K, NY) seen.

REFERRED HERE: Hupeh, *A. Henry* 7448 (BM, GH, K); *E. H. Wilson*, April, 1900 (US). Szechwan: Nan-chuan, 1580 m., *K. F. Li* 63169 (E).

184. *Delphinium umbrosum* Hand.-Mazz. Symb. Sinicae 7: 278. fig. 4, nos. 7-9. 1931. FIG. 15, N.

Rhizome short, thickish, the roots fascicled, long, thick, woody; stem 6-9 dm. tall, simple, sulcate, short- and retrorse-strigose, equably leafy; leaves pentagonal-reniform in outline, to 12 cm. wide, tripartite almost to base, the lateral parts less profoundly bifid, all parts narrowly obovate-rhombic, rather long-acuminate, incised, dark green, sparsely strigose above, densely so beneath; upper petioles gradually shorter, narrowed into slender sheaths; racemes lax, to 10-flowered, densely retrorse-hairy, with normal leaves below and entire lanceolate to linear bracts above; pedicels 1.5-6 cm. long, suberect or arcuate; bracteoles apical or farther down, linear, 8-10 mm. long, strigulose; sepals violet, broadly ovate, 12-15 mm.



long, rounded, the lateral with median nerve dilated at apex, strigulose; spur more than twice the length of the blade of the sepal, deflexed, 3 mm. wide at the base, obtuse; upper petals almost 3 mm. shorter than the sepals, ca. 3.5 mm. wide, oblique; truncate, minutely and acutely bilobed at tip; lower laminae shorter, hairy from the claw, 6 mm. by 3 mm., rather deeply oblong-lobed, the claw 5 mm. long; stamens 6–7 mm. long, glabrous; anthers brown; carpels 3, sparsely hairy.

TYPE: Northwest Yunnan, hemlock forests on the Nguka-la between Dschungdien (Chungtien) and Djitsung on the Djinsche-djiang, 3750–3800 m., *Handel-Mazzetti* ? 7809 (w?), not seen. The illustrations are helpful.

SPECIMENS SEEN. Yunnan: C. W. Wang 69052 (A); H. T. Tsai 52675 (A); K. M. Feng 1726 (A); A. Henry 9668 (MO, NY), 9668 A (US). Szechwan: T. T. Yü 979 (GH). Upper Burma: Forrest 25052 (US), characterized by its long-acuminate leaf lobes.

185. *Delphinium uralense* Nevski in Komarov, Fl. U.S.S.R. 7: 159. 725. 1937. FIG. 15, O.

*Delphinium dyctiocarpum* DC. subsp. *uralense* (Nevski) B. Pawl, Fragmenta Floristica & Geobotanica 9: 429. 1963.

*Delphinium dyctiocarpum* var. *canescens* Korsh. Tent. Fl. Ross. Or. 18. 1898.

Entire plant grayish-strigulose; stems 5–11 dm. tall, ribbed below, rather equably and closely leafy; petioles to 1 dm. long, vaginate at base; leaf blades round-cordate to -reniform, 3.5–7 cm. long, 5.5–12 cm. wide, palmatisect, the segments commonly ternately divided into terminal lance-linear lobes 2–4 mm. wide and with 2–3 teeth, densely strigose on both surfaces, but paler beneath; raceme sometimes branched below, dense, many flowered, the flowers light blue; bracts lance-subulate, stiff, 5–7 mm. long; bracteoles strigose, linear-subulate, 3.5–6 mm. long, placed above the middle of the pedicel which is strigose, suberect, to 1 cm. long; sepals ovate, obtuse, tomentellous, the upper ovate, 14–15 mm. long, 8 mm. wide, the tip subacuminate, upcurved; spur cylindrical, 12 mm. long, 2–2.5 mm. wide, obtusely acuminate, more or less uncinatate at tip; lateral sepals elliptic-obovate, 13–14 mm. by 8–9 mm., obtuse; lower sepals 13 mm. by 6 mm.; petals pale, the upper laminae somewhat oblique, 10 mm. long, 3 mm. wide, entire and glabrous, the spur 13 mm. long; lower laminae very oblique, rather oblong, 5 mm. by 3 mm., bifid to one-fourth its length into rounded-oblong lobes, bearded and long-ciliate, the claw 5 mm. long; stamens 5–6 mm. long; anthers dark, round-oblong, 0.8 mm. long; carpels 3, very densely pubescent.

TYPE: Prov. Orenburg, near Andreevka, D. Litwinow, July 7, 1893 (LE); seen.

*Delphinium uralense* differs from *D. dyctiocarpum* which is much less pubescent and has dark petals.



## GROUP IX

Leaves rather coarsely lobed as in Group VIII, but the petals very dark, in most cases almost black. Spurs straight or some decurved.

This group is purely artificial and does not correspond with any taxonomic subdivisions that have been proposed.

## KEY TO SPECIES

1. Spur about half as long again as the blade of the upper sepal.
  2. Stem and inflorescence axis glabrous or nearly so.
    3. Sepals mostly glabrous, 10–25 mm. long.
      4. Upper sepal blade 21–25 mm. long; spur 26–42 mm. long. Szechwan. . . . . 222. *D. oxycentrum*.
      4. Upper sepal blade 10–14 mm. long; spur 12–20 mm. long. Altai. . . . . 199. *D. dyctiocarpum*.
    3. Sepals not glabrous, 14–16 mm. long. Szechwan. (Treated in Group VIII). . . . . 169. *D. mizugense*.
  2. Stem and/or inflorescence axis pubescent.
    5. Inflorescence with spreading glandular hairs; bracteoles 3–5 mm. long. Shansi. . . . . 212. *D. leptopogon*.
    5. Inflorescence lacking glandular hairs; bracteoles largely 5–10 mm. long.
      6. Lamina of upper petal ciliate; carpels glabrous; stem pilose. Eastern Siberia. . . . . 195. *D. crassicaule*.
      6. Lamina of upper petal glabrous; carpels hairy.
        7. Stems more or less retrorse-pubescent; bracteoles lance-linear; sepals glabrous within. Western China. . . . . 191. *D. chenii*.
        7. Stems with long spreading hairs; bracteoles lance-ovate; sepals strigose on both surfaces. Semipalatinsk. . . 228. *D. sauricum*.
1. Spur mostly not half as long again as the blade of the upper sepal.
  8. Sepals pubescent within.
    9. Sepals glabrous on the outer surface.
      10. Inner surface of sepals with long tangled hairs at base, or at least a few hairs near the tip; sepals 12–15 mm. long. Southern Caucasus, adjacent Turkey. . . . . 190. *D. buschianum*.
      10. Inner surface of sepals not long-hairy; sepals 18–30 mm. long.
        11. Spur 15–25 mm. long; laminae of upper petals glabrous. China. (Treated in Group VI). . . . . 81. *D. albocoeruleum*.
        11. Spur 12–15 mm. long; laminae of upper petals bristly. Turkey. . . . . 205. *D. formosum*.
    9. Sepals pubescent on the outer surface.
      12. Inflorescence axis with spreading hairs.
        13. Upper sepal 12–15 mm. long, spur 10–15 mm. long.
          14. Sepals white with yellow nerves; lamina of upper petal entire, hairy at tip. Uzbekistan. . . . . 219. *D. nevskii*.
          14. Sepals blue or purple; lamina of upper petal emarginate, often glabrous at tip.
            15. Bracteoles at the base of the flower; sepals deep blue to purple.
              16. Stems 1–4 dm. tall; spur 10–12 mm. long; lower petioles vaginate. Turkestan, Pamir. (Treated in Group V). . . 62. *D. dasyanthum*.



- 16. Stem 6–12 dm. tall; spur 12–15 mm. long; lower petioles scarcely dilated. Himalaya. . . . . 224. *D. pyramidale*.
- 15. Bracteoles remote from the flowers; sepals dilute blue. Bokhara. . . . . 221. *D. oreophilum*.
- 13. Upper sepal 15–25 mm. long; spur 15–18 mm. long.
- 17. Lamina of upper petal entire, 10 mm. long; lamina of lower petal 5 mm. long. Altai. . . . . 217. *D. mirabile*.
- 17. Lamina of upper petal not entire, 13–14 mm. long; lamina of lower petal 7–8 mm. long.
- 18. The lamina of upper petal bidentate; bracteoles ca. 10 mm. long; seeds winged. Himalaya. (Treated in Group V). . . . . 55. *D. vestitum*.
- 18. Lamina of upper petal emarginate; bracteoles 4–6 mm. long; seeds squamate. Caucasus. . . . . 229. *D. speciosum*.
- 12. Inflorescence with appressed hairs.
- 19. Upper sepal slaty to pale blue, 18–20 mm. long. Tibet, China. (Treated in Group VI). . . . . 81. *D. albocoeruleum*.
- 19. Upper sepal deep blue to purplish, 12–17 mm. long.
- 20. Lamina of upper petal rounded at apex; upper sepal 12–15 mm. long; spur 11.5–13 mm. long. Western China. . . . . 210. *D. kuanii*.
- 20. Lamina of upper petal emarginate at apex; upper sepal 15–17 mm. long; spur 18–20 mm. long. Iran. . . . . 201. *D. elbursense*.
- 8. Sepals not pubescent on inner surface.
- 21. Sepals glabrous on outer surface except sometimes ciliate on margin.
- 22. Pedicels glandular-pubescent; stem 10–15 dm. tall, mostly glabrous. Himalaya. . . . . 224. *D. pyramidale*.
- 22. Pedicels not glandular-pubescent.
- 23. Upper sepal 10–16 mm. long.
- 24. Flowers ca. 10 in a lax raceme; upper sepal 13–14 mm. long; spur 17–18 mm. long; laminae of upper petals emarginate. Sinkiang. . . . . 213. *D. longiciliatum*.
- 24. Flowers many in a dense raceme.
- 25. Upper sepal 10–11 mm. long, the spur 10–13 mm. long.
- 26. Leaf blades cordate at base; bracteoles ovate to elliptic, 4–5 mm. long; upper petal glabrous at tip. Sikang. . . . . 218. *D. naviculare*.
- 26. Leaf blades almost straight across the base; bracteoles oblanceolate, 5–8 mm. long; upper petal bristly-hairy at tip. Siberia. . . . . 226. *D. retrotilosum*.
- 25. Upper sepal 13–16 mm. long; spur 13–18 mm. long.
- 27. Lamina of upper petal subtruncate at apex; leaf blades round-cordate in outline. Central and eastern Siberia. . . . . 200. *D. elatum*.



- 27. Lamina of upper petal bidentate at apex; leaf blades broader than long. Caucasus. .... 204. *D. flexuosum*.
- 23. Upper sepal 18–30 mm. long.
  - 28. Bracteoles 2–3 mm. wide; upper sepal 18–20 mm. long.
    - 29. The bracteoles well below the flowers; inflorescence pyramidal-paniculate; stem with scattered long spreading hairs. Ossetia. ... 188. *D. bracteosum*.
    - 29. The bracteoles subtending the flowers; inflorescence racemose; stem strigulose below, otherwise glabrous. Dagestania. .... 215. *D. mariae*.
  - 28. Bracteoles 3–5 mm. wide; upper sepal mostly longer.
    - 30. Spur 12–15 mm. long; upper sepal 20–30 mm. long; inflorescence paniculate. Turkey. .... 205. *D. formosum*.
    - 30. Spur 18–20 mm. long; upper sepal 20–22 mm. long; inflorescence racemose. Caucasus.
      - 31. Lamina of upper petal deeply bidentate; upper sepal 20 mm. long. ... 227. *D. ruprechtii*.
      - 31. Lamina of upper petal emarginate; upper sepal 20–30 mm. long. .... 216. *D. megalanthum*.
- 21. Sepals not glabrous on outer surface.
  - 32. Inflorescence with some glandular hairs (yellow, inflated), these often mixed with various non-glandular hairs.
    - 33. Sepals variegated, pale blue and white. Transcaucasia. .... 202. *D. elisabethae*.
  - 33. Sepals not so variegated.
    - 34. Flowers rather large, the sepals mostly 15–22 mm. long.
      - 35. Lamina of upper petal sharply bidentate, of lower petal long-ciliate. Dagestan. ... 187. *D. arcuatum*.
      - 35. Lamina of upper petal entire, of lower petal not ciliate. Siberia. .... 220. *D. ochotense*.
    - 34. Flowers smaller, the sepals 9–14 mm. long.
      - 36. Upper petal with 2 narrow terminal pointed lobules; flowers white, tinged with green. Southern Tibet. .... 206. *D. hillcoatiae*.
      - 36. Flowers violet, blue or purple.
        - 37. Inflorescence 1–2–(3)-flowered; upper sepal 12–13 mm. long; spur 14–16 mm. long. Bhutan. .... 193. *D. cooperi*.
        - 37. Inflorescence with more numerous flowers.
          - 38. Plant 2.5–4 dm. tall; raceme 6–15-flowered; spur 14–15 mm. long. Altai. .... 232. *D. ukokense*.
          - 38. Plant mostly taller.
            - 39. Flowers 3–10; upper sepal 12–14 mm. long. Upper Burma. .... 189. *D. burmaense*.
            - 39. Flowers more numerous; upper sepal 12 mm. long.



- 40. Pubescence of sepals not glandular.
  - 41. Sepals villous with spreading white hairs, pale purplish blue; carpels hairy. Afghanistan. . . . . 186. *D. afghanicum*.
  - 41. Sepals puberulous, pale blue; carpels glabrous. Transcaucasia. . . . . 225. *D. pyramidatum*.
  - 40. Pubescence of sepals short, glandular; sepals 10–18 mm. long; carpels glabrous. Mongolia, etc. . . . . 208. *D. inconspicuum*.
- 32. Inflorescence lacking glandular hairs, the hairs white and slender.
  - 42. Petioles scarcely or not dilated at the base.
    - 43. Stems scarcely taller than the basal leaves; sepals 19–25 mm. long. Caucasus. (Treated in Group V). . . . . 61. *D. caucasicum*.
    - 43. Stems much taller than the basal leaves.
      - 44. Sepals strigulose.
        - 45. Raceme many flowered, the sepals deep blue, 17–18 mm. long; spur 17 mm. long. Turkestan. . . . . 234. *D. winklerianum*.
        - 45. Raceme 4–10-flowered, lax; sepals purplish, 10–15 mm. long. Sikang.
          - 46. Bracteoles 5–7 mm. long; spur 2–2.5 mm. thick at base; stamens glabrous. . . . . 203. *D. elliptico-ovatum*.
          - 46. Bracteoles 8–10 mm. long; spur 4–4.5 mm. thick at base; stamens pilose. . . . . 210. *D. kuanii*.
      - 44. Sepals villous or hairy.
        - 47. Upper sepal 12–15 mm. long, the spur about as long.
          - 48. Raceme lax; stem 10–12 dm. tall; lamina of upper petal glabrous, entire. Siberia. . . . . 233. *D. villosum*.
          - 48. Raceme subcapitate; stem 2–6 dm. tall; lamina of upper petal bilobulate, setose. Turkestan. . . . . 223. *D. poltaratzkii*.
        - 47. Upper sepal 18–25 mm. long; spur 18–20 mm. long.
          - 49. Upper sepal ca. 18 mm. long. Upper Assam to Nepal. . . 230. *D. stapeliosum*.
          - 49. Upper sepal 20–22 mm. long. Caucasus. (Treated in Group VIII). . . . . 148. *D. dasycarpum*.
  - 42. Petioles, at least the lower, more or less dilated at base.



- 50. Upper petals entire at the apex or nearly so.
  - 51. Inflorescence with some glandular hairs; upper sepal 14–17 mm. long; spur about as long. Central Siberia. . . . . 196. *D. crassifolium*.
  - 51. Inflorescence lacking glandular hairs.
    - 52. Hairs of stem mostly spreading; upper sepal 14–16 mm. long; spur 15–20 mm. long. Manchuria, Korea. . . . . 214. *D. maackianum*.
    - 52. Hairs of stem retrorse to appressed.
      - 53. Upper sepal ca. 18 mm. long; spur 16–20 mm. long; flowers more or less yellowish-hairy. Burma. . . . . 211. *D. lacei*.
      - 53. Upper sepal 14–15 mm. long.
        - 54. Spur ca. 22 mm. long. Sikang. . . . . 191. *D. chenii*.
        - 54. Spur ca. 12 mm. long. Nepal. (Treated in Group VI). . . . . 97. *D. incisum*.
- 50. Upper petals emarginate or notched at apex.
  - 55. Hairs closely appressed; sepals light blue, the upper 13–15 mm. long; spur 14 mm. long. Transcaucasia. (Treated in Group VI). . . . . 91. *D. crispulum*.
  - 55. Hairs more or less spreading on stems.
    - 56. Sepals nearly or quite glabrous.
      - 57. Lamina of lower petal divided halfway.
        - 58. Upper petal with hairs at tip; sepal spur 15–18 mm. long. Caucasus. . . . . 204. *D. flexuosum*.
        - 58. Upper petal glabrous at tip; sepal spur 13–14 mm. long. Kolgujev Island, northern Siberia. . . . . 197. *D. cryophilum*.
      - 57. Lamina of lower petal mostly less deeply divided.
        - 59. Lamina of upper petal broadened upward, oblique; bracts and bracteoles lanceolate. Central Siberia. . . . . 198. *D. duhmbergii*.
        - 59. Lamina of upper petal scarcely broadened upward, almost straight; bracts and bracteoles linear. Widely distributed across northern Siberia. . . . . 200. *D. elatum*.
    - 56. Sepals pubescent.
      - 60. Pedicels 5–15 mm. long.
        - 61. Bracteoles lance-linear. Caucasus, Transcaucasia. . . . . 204. *D. flexuosum*.
        - 61. Bracteoles broadly ovate. Asia Media. . . . . 192. *D. confusum*.
      - 60. Pedicels 10–80 mm. long.



- 62. Flowers few, subumbellate, pale violet. East Turkestan. . . . . 194. *D. corymbosum*.
- 62. Flowers several to many, racemose.
- 63. Bracteoles near the middle of the pedicel.
- 64. Upper sepal 18 mm. long; spur 20 mm. long. Khasia, Bhutan. . . . . 230. *D. stapeliosum*.
- 64. Upper sepal 12–16 mm. long; spur 12–16 mm. long. Northern Siberia. . . . . 200. *D. elatum*.
- 63. Bracteoles very near the flower.
- 65. Upper sepal 17–18 mm. long; spur often suberect. Nepal. 207. *D. himalayae*.
- 65. Upper sepal 11–15 mm. long; spur spreading.
- 66. Sepals strigulose; leaves more or less reniform in outline; bracteoles slightly below the sepals. Sikang. 231. *D. tianshanicum*.
- 66. Sepals loosely pubescent; leaves rounded in outline; bracteoles subtending the flower. Turkestan, Tianshan. . . 198. *D. duhmbergii*.

186. *Delphinium afghanicum* Rech. f. Anz. Österr. Akad. Wiss. Math.-Nat. 91: 74. 1954. FIG. 16, A.

Perennial from a woody root, forming clumps, each stem 4–10 dm. tall, simple or few branched near the middle, rather evenly leafy to below the inflorescence, loosely villous below, more densely so above with long spreading white nonglandular hairs, mixed with shorter glandular ones in the inflorescence; lower petioles to about 2 dm. long, villous, vaginate at the base, the upper gradually shorter; leaf blades to 6 cm. long by 4 cm. broad, the veins conspicuous beneath, loosely villous, 5-fid about two-thirds of the way to the base, the segments cuneate-obovate, lobed-incised into 3 principal parts, these with broad rounded coarse mucronate teeth; inflorescence racemose or with 1 to few supplementary racemes below, rather laxly flowered; lowest bracts trifid, others lanceolate to lance-linear, villous, 5–10 mm. long; pedicels divaricate, villous, 1–4 cm. long; bracteoles 2, near the flower, lance-linear, 3–4 mm. long; sepals pale purplish blue, densely villous, the upper sepal ovate, 12 mm. long, 6 mm. wide,



subacute, the spur subconic, 7–8 mm. long, 3–4 mm. wide at base; lateral sepals elliptic-oblong, 12 mm. long, 5 mm. wide, rounded at apex, hairy on the whole outer surface; lower sepals elliptic, 13 mm. long, 5.5 mm. wide, subacute; petals dark, the upper lamina almost straight, broad in middle, 8.5 mm. long, slightly bidentate at the glabrous apex, the spur 9.5 mm. long; lower lamina almost straight, ovate, 5 mm. by 4 mm., cleft to near the middle, yellow bearded at base, with scattered white hairs on rest of the surface and margin, claw 5 mm. long; stamens 6 mm. long, moderately dilated below, glabrous; anthers brownish, oblong, 1 mm. long; follicles 3, hairy.

TYPE: Afghanistan, Minjan Pass, at 3800 m., July 26, 1937, *W. Koelz* 12719 (US); seen. *Delphinium afghanicum* differs from *D. speciosum* in its longer hairs, entire bracts, and lax inflorescence.

187. *Delphinium arcuatum* Busch in Fl. Cauc. Crit. III. 3: 71. 1902.

FIG. 16, B.

Stem 8–10 dm. tall, densely strigulose, somewhat flexuous, sulcate, rather densely and evenly leafy; cauline petioles to 1 dm. long, not vaginate at base, the blades more or less round-reniform in outline, 5–12 cm. broad, sparsely strigose above, densely so beneath, 5-parted to 1–2 cm. from the base, the segments broadly cuneate, 3-lobed distally and with rather many divergent lance-oblong teeth or lobules 3–7 mm. wide; inflorescence few branched below, the main raceme many flowered, to 3 dm. long, more or less strigose to partly spreading-pubescent; lower bracts leafy, palmatifid, others lanceolate, bluish, 1–2 cm. long, 3–4 mm. wide; pedicels arched, with some glandular hairs, usually 3–4 cm. long, the upper 1–2 cm., very densely covered with short spreading hairs; bracteoles just beneath the flower, ovate-lanceolate or ovate, 6.5–12 mm. long, 2.5–3.5 mm. wide, blunt; sepals violet blue, 16–21 mm. long, 6–12 mm. wide, pubescent, the border white-ciliate; upper sepals ovate, 18–20 mm. long, 7 mm. wide, subacute, the spur spreading decurved, 16 mm. long, 4 mm. wide at base; lateral sepals subovate, 20 mm. by 10 mm., rounded-obtuse; lower sepals 18 mm. by 9 mm., more pointed; petals black, the upper laminae almost straight, 11–12 mm. long, glabrous, bidentate, the spur 12 mm. long; lower laminae strongly oblique, oblong, 5.5 mm. by 3 mm., bearded at base, ciliate, bifid to about the middle into 2 lanceolate divergent lobes, claw 6 mm. long; stamens 6–7 mm. long; anthers dark, over 1 mm. long; carpels 3, sparsely strigose.

TYPE: E. Caucasus, Dagestan, distr. Samur near Kurusch, 2400 m., Aug. 1, 1898, *Th. Alexeenko* (LE); seen.

188. *Delphinium bracteosum* Somm. & Levier, Acta Horti Petrop. 13: 25. 1893.

FIG. 16, C.

Erect, light green, with long scattered spreading hairs, the stem fistulose, somewhat angled, subglabrous above, ca. 3 dm. tall; leaves palmately



5-parted, 5–8 cm. in diameter, sparsely hairy on both sides, the sinuses narrow, acute, the segments broad, the lower divergent, incised, the ultimate divisions few, subobtuse, 6–8 mm. wide, the nerves prominent beneath; upper leaves tripartite; petioles not strongly dilated at the base, those of the midcauline leaves equal to the blade, of the upper shorter to none; inflorescence pyramidal-paniculate to simple and few flowered; pedicels glabrous to hairy, the lower longer than the spurs; bracts elliptic or lanceolate to spatulate, villous, 10–20 mm. long; bracteoles blue, near the base of the flower, ca. 10 mm. long, 2 mm. wide; sepals intensely blue, 18–22 mm. long, 12–15 mm. wide, ciliate, otherwise glabrous to hairy; upper sepal 19–22 mm. long, spur straight, 18–24 mm. long; other sepals 18–22 mm. long, 9–10 mm. wide; petals dark, the upper laminae almost straight, 14 mm. long, subemarginate, glabrous; the lower laminae oblong-ovate, 9.5 mm. by 7 mm., long-ciliate, yellow bearded at base, divided about halfway into 2 unequal oblong lobes, claw 6 mm. long, appendiculate; stamens glabrous, 7–8 mm. long; follicles glandular; seeds transversely lamellate-cristate.

TYPE: Zei in Ossetia, central Caucasus, coll. *Lojka* (LE?); not seen.

ILLUSTRATION. DÉCHY, Kaukasus, 3: *pl.* 8, *fig.* 1–6. 1907; according to *Index Londinensis*.

SPECIMEN SEEN. South Ossetia: *E. & N. Busch*, Aug. 12, 1935, at 2700 m. (BM).

189. *Delphinium burmaense* Munz, sp. nov.

FIG. 16, D.

*Delphinium stapeliosum* Brühl var. *shanicum* Brühl in Brühl & King, Ann. Bot. Gard. Calc. 5: 102. 1896. Based on Shan Hills, *Collett* (K); seen.

Perennial from a slender woody rootstock; stem slender, mostly dark, with numerous spreading whitish or yellowish hairs ca. 2 mm. long, simple, 2–12 dm. tall, few leaved; basal leaves with slender villous petioles 5–25 cm. long, very vaginate at base, the blades subreniform, rather densely villous on both surfaces, 3–15 cm. broad, 2–8 cm. long, deeply to shallowly notched at base, 3–5-segmented about halfway to base, the segments broad, oblong-ovate to -obovate, sometimes shallowly lobed, but more usually with rounded-ovate coarse mucronate teeth 2–5 mm. deep, 2–10 mm. wide; upper leaves reduced; inflorescence a few-flowered, somewhat secund raceme, villous, more or less glandular; lower bracts foliose, others oblong-linear to lanceolate, 5–12 mm. long; pedicels ascending to erect, 1–5 cm. long; bracteoles subtending the flower, oblong-linear, 4–10 mm. long; flowers violet, mostly 3–10, villous; upper sepal ovate, 12–14 mm. long, 8–10 mm. wide, obtuse, the spur 15–20 mm. long, 2.5–3.5 mm. wide at base; lateral sepals 10–17 mm. long, 7–10 mm. wide, oblong-obovate, rounded at apex; lower sepals 9–14 mm. long, obtuse; petals dark, the upper laminae slightly oblique, 8–10 mm. long, bidentate at the somewhat bristly apex, the spur 15–18 mm. long; lower laminae oblong, bearded, deeply bifid into lance-oblong lobes, the claw 5–7 mm. long; stamens 6–7 mm. long, glabrous; anthers dark, scarcely 1 mm. long; carpels 3, hairy.



Caulis tenuis, villosus, simplex, 2–12 dm. altus, cum foliis paucis; petioli foliorum basilarium 5–25 cm. longi, vaginati; laminae subreniformes, villosae, 3–15 cm. latae, 2–8 cm. longae, 3–5-partitae, segmentis latis, oblongo-ovatis vel -obovatis; inflorescentia racemosa, secunda; bracteae oblongo-lineares vel lanceolatae, 5–12 mm. longae; pedicelli ascendentes vel erecti, 1–5 cm. longi; bracteolae florem subtendentes, oblongo-lineares, 4–10 mm. longae; flores 3–10, villosi, violacei; sepalum superiore ovatum, 12–14 mm. longum, 8–10 mm. latum, obtusum, calcar 15–20 mm. longum, base 2.5–3.5 mm. crassum; sepala lateralia 10–17 mm. longa, 7–10 mm. lata, oblongo-obovata; sepala inferiora 9–14 mm. longa, obtusa; laminae petalorum superiorum atrae, 8–10 mm. longae, bidentatae, setosae, calcar 15–18 mm. longum; laminae inferiores oblongae, barbatae, bifidae, unguis 5–7 mm. longum; stamina 6–7 mm. longa, glabra; carpella 3, hirsuta.

TYPE: Nam-Tamai Valley, Burma, ca. 3000 m., thickets in a steep gully, Sept. 6, 1937, *F. Kingdon Ward 13170* (BM).

RANGE. Throughout Burma from 1500–4000 m. alt.

OTHER EXAMPLES. **Burma:** Shen Hills, *Collett 964* (K); Shan States, *Hildebrand* (K); *Melville 43* (BM); Upper Adung Valley, no. of Lung Sa, *Kingdon Ward 10115* (BM); Mindat, *Kingdon Ward 22505* (BM, F); Taunggyi, *Dickason 9052* (A); Nam Tami Valley, *Kingdon Ward 3351* (BM); Burma-Tibet frontier, *Kingdon Ward 9819* (BM, F); Taunggyi crags, *Robertson 15* (K); Sirhoi, *Kingdon Ward 18120* (A, BM). A specimen from Assam (Orka La, *Kingdon Ward 14308*, BM) seems to belong here; it is rather depauperate.

*Delphinium burmaense* differs from *D. stapeliosum* from Nepal in its smaller flowers, presence of glandular hairs in the inflorescence and the spreading, not retrorse, hairs on the stems.

190. *Delphinium buschianum* Grossheim, Trud. Azerb. Otdyel. Zakavk. Fil. Akad. Nauk. U.S.S.R. Sect. Bot. 1: 51. 1933. FIG. 16, E.

*Delphinium linearilobum* var. *hirticaule* Grossheim, Fl. Cauc. 2: 99. 1930, fide Nevski in Fl. U.S.S.R. 7: 143. 1937.

Stem ca. 7.5 dm. high, somewhat angular below, with some divergent retrorse simple white hairs 0.75 mm. long, foliose; inflorescence rather glabrous; petioles scattered hairy, somewhat vaginate; cauline leaves rounded-cordate to almost round in outline, glabrous on both surfaces or weakly pubescent on veins beneath; laminae divided into 3 lobes 3–6 mm. from base, the middle lobe rhombic-lanceolate, somewhat acuminate, the lateral lobes divided into 2 so that there are 5 resultant segments, laciniate into acute or acuminate lanceolate teeth or lobules 3–6 mm. wide, 3–15 mm. long; inflorescence several branched, rather compact, the axes purplish, glabrous, to ca. 2.5 dm. long; bracts purplish, ca. 1 cm. long, lance-linear, rarely ciliate near the tip; bracteoles linear, glabrous or slightly ciliate, placed just below the flower, 5–7 mm. long; sepals dark blue or violet-blue, glabrous on outer surface, with white felt inside in the lower half of long entangled hairs or at least with a few hairs, sometimes weakly ciliate,



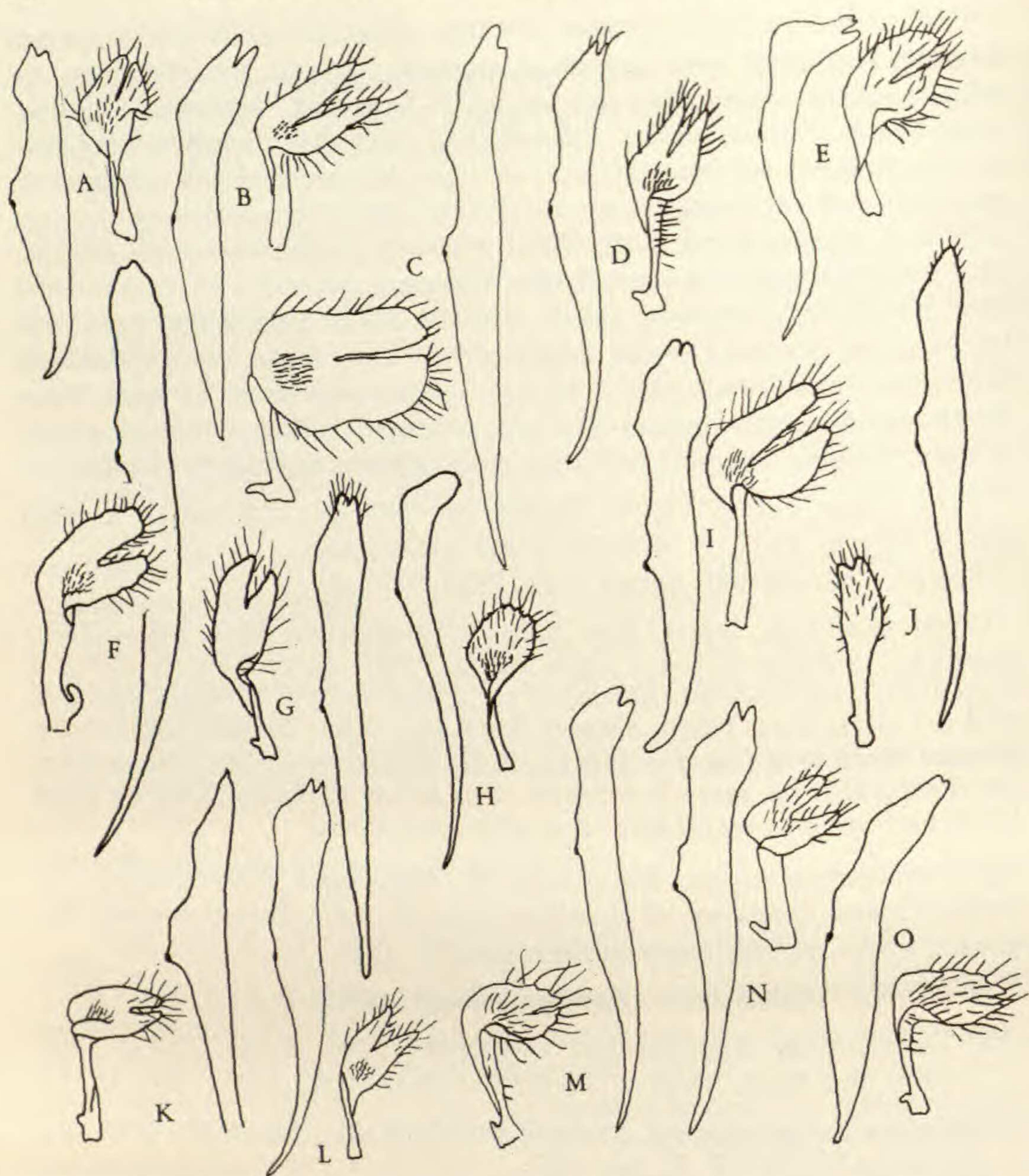


FIGURE 16. *Delphinium*, GROUP IX. Petals drawn, the upper spurred, the lower clawed. A. *D. afghanicum*; upper petal blade 8.5 mm. long, spur 9.5 mm.; lower blade 5 mm. long, claw 5 mm.; drawn from *Koelz 12719* (US). B. *D. arcuatum*; upper blade 11 mm. long, spur 11 mm.; lower blade 5.5 mm. long, claw 5.5 mm.; drawn from *Alexeenko* TYPE (LE). C. *D. bracteosum*; upper lamina 14 mm. long, spur 17 mm.; lower lamina 9.5 mm. long, claw 5 mm.; drawn from *E. & N. Busch* (BM). D. *D. burmaense*; upper lamina 9 mm. long, spur 13 mm.; lower petal lamina 5 mm. long, claw 5.5 mm.; drawn from *Kingdon Ward 13170* (BM). E. *D. buschianum*; upper lamina 9 mm. long, spur 11 mm.; lower lamina 5 mm. long, claw 5 mm.; drawn from *Karagin & Safiev* in 1931, TYPE (LE). F. *D. chenii*; upper petal lamina 13 mm. long, spur 22 mm.; lower lamina 6 mm. long, claw 6.5 mm.; drawn from *Yü 12809* (A). G. *D. confusum*; upper lamina 12 mm. long, spur 15 mm.; lower lamina 7 mm. long, claw 5.5 mm.; drawn from *Abolin 8193*, TYPE (LE). H. *D. cooperi*; upper lamina 8 mm. long, spur 16 mm.; lower lamina 4 mm. long, claw 5 mm.; drawn from *Cooper & Bulley 2294*, TYPE (E). I. *D. corymbosum*; upper lamina 11.5 mm. long, spur 10.5 mm.; lower lamina 7 mm. long, claw 7 mm.; drawn from TYPE



ovate, 12–15 mm. long, 7–8 mm. wide, obtuse; spur 10–15 mm. long, often hooked at apex; petals black, the upper laminae somewhat oblique, 9 mm. long, bidentate at the glabrous apex, spur ca. 10 mm. long; lower laminae sparsely bearded, strongly ciliate, very oblique, obovate, 5 mm. by 3 mm., bifid over halfway into lance-oblong divergent lobes, claw 5 mm. long; follicles 3, erect, 10 mm. long, 3 mm. wide, glabrous except along sutures.

TYPE: Southern Caucasus, shores Lake Cevan, *Karjagin & Safiev*, Aug. 15, 1931 (K, LE), seen.

DISTRIBUTION. The species grows on igneous rocks below 2100 m., Soviet and Turkish Armenia, and is represented by *Davis 32562*, in part, (K) from Kars Prov., Turkey.

191. *Delphinium chenii* W. T. Wang, *Acta Phytotax. Sinica* 6: 369. 1957. FIG. 16, F.

*Delphinium albomarginatum* Chen, *Bull. Fan Mem. Inst. Biol., Peiping* (n.s.) 1: 170. 1948; not Simonova, 1924.

Perennial from a slender rhizome; stem 3–4 dm. tall, simple or short branched above, 3–4 mm. thick, striate, more or less retrorse-pubescent, equably and fairly densely leafy; petioles slender, 3–5 cm. long, scarcely dilated at the base, somewhat retrorse-strigose; blades pentagonal-orbicular in outline, 2–5 cm. in diameter, subglabrous to sparsely pubescent, pallid beneath, parted to near the base into cuneate-obovate segments, these 3-toothed or -lobed, or with a few additional teeth, the ultimate parts lance-ovate, rather short, obtuse to acute; inflorescence racemose or narrow-paniculate, retrorse-pubescent with white and yellow hairs, some rather long; flowers several; bracts largely reduced divided leaves, hairy; pedicels erect, 1–3 cm. long, hairy; bracteoles lance-linear, 5–10 mm. long, pubescent, placed slightly below the flowers; sepals strigose and short-hairy, blue with white margins (especially on the 2 lower pairs); upper sepal broadly ovate, 15 mm. long, 12 mm. wide, somewhat apiculate, the spur 22 mm. long, 4 mm. wide at the base, spreading decurved, narrowed to a subcylindric tip; lateral sepals pubescent on midrib, oblong-ovate, 14 mm. long, 10 mm. wide, rounded at apex; lower sepals rhombic-obovate, 15 mm. long, 9 mm. wide, rounded-obtuse; petals dark, the upper laminae

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sent by *Akegel* (LE). J. *D. crassicaule*; upper lamina 10 mm. long, spur 15 mm.; lower lamina 5 mm. long, claw 5 mm.; drawn from *Bernhardi Herbarium* (MO 1798761). K. *D. crassifolium*; upper lamina 10 mm. long, spur 14 mm.; lower lamina 5 mm. long, claw 6.5 mm.; drawn from *Radde* (GH). L. *D. cryophilum*; upper lamina 10 mm. long, spur 12 mm.; lower lamina 5 mm. long, claw 4 mm.; drawn from *Pohle* in 1902, TYPE (LE). M. *D. duhmbergii*; upper lamina 10 mm. long, spur 16 mm.; lower lamina 4.5 mm. long, claw 5.5 mm.; drawn from *Regel* in 1887 (US). N. *D. dyctiocarpum*; upper lamina 9 mm. long, spur 14 mm.; lower lamina 4.5 mm. long, claw 6 mm.; drawn from *Dress 8603* (BH). O. *D. elatum*; upper lamina 10 mm. long, spur 11 mm.; lower lamina 5 mm. long, claw 5 mm.; drawn from *Korshinsky* in 1891, TYPE of *D. korshinskyanum* (LE).



straight, 13 mm. long, 3 mm. wide, glabrous, somewhat erose at the rounded summit, spur 22 mm. long; lower laminae oblique, oblong, 6 mm. long, 4 mm. wide, cleft halfway into ciliate oblong lobes, with patch of yellow hairs at base below the cleft, claw 6.5 mm. long; stamens 6 mm. long, strongly dilated at base, glabrous; anthers dark, 1.2 mm. long; carpels 3, densely yellow-hairy.

TYPE: Southern Sikang, Taucheng, Hsien, Wongtula, 3000 m., *T. T. Yü* 12809 (PE), not seen; photo. (E), seen. A sheet at A has the same number, but says "Yunnan" and lacks data.

192. *Delphinium confusum* Popov in Komarov, Fl. U.S.S.R. 7: 136, 723. 1937. FIG. 16, G.

*Delphinium duhmbergii* Huth, Bot. Jahrb. 20: 402. 1895, *pro parte*.

*Delphinium speciosum* Huth, *loc. cit.* 415, *pro parte*.

Stem 3–6.5 dm. tall, densely pilose, the hairs in the lower part 1.5–2 mm. long, the upper part densely soft-pubescent, not glandular; stem rather equably but not densely leafy; petioles to 2 dm. long, dilated at base, long-pilose; leaf blades round-reniform, densely pubescent or more or less pilose on both sides, trifid, the middle segment oblong-obovate, cut into 3 lobes each with 3–4 lance-ovate teeth to 1 cm. long and 8 mm. wide; lateral segments of leaf cut into parts much like those of the middle one; raceme dense, sometimes branched at the base, many flowered; bracts broadly lanceolate or lanceolate, entire or rarely the lower trisect, obtusish, ca. 1 cm. long, densely and short pilose; pedicels 5–15 mm. long, with short spreading hairs; bracteoles broadly ovate, obtuse or subobtuse, 5.5–8 mm. long, 3–5 mm. wide, pubescent; flowers dark violet; sepals ovate or obovate, obtuse, 10–15 mm. long, 5–8 mm. wide, densely pubescent with short hairs without, almost glabrous within; spur spreading horizontally, incurved near the apex, 12–15 mm. long, 2.5–3 mm. wide at base; petals black, the upper laminae almost straight, 12 mm. long, emarginate and bristly at apex, the spur 15 mm. long; lower laminae oblong-obovate, long-ciliate, cleft almost halfway, ca. 7 mm. long, the claw appendiculate, 5.5 mm. long; carpels 3, densely pubescent.

TYPE: Asia Media, m. Akbach-tau, Aug. 12, 1921, *Abolin* 8193 (LE); seen. This species keys out near *D. flexuosum* from farther west, but has much broader bracteoles.

193. *Delphinium cooperi* Munz, sp. nov.

FIG. 16, H.

From a slender woody rootstock, the stem very slender, 1–4.5 dm. tall, with soft spreading hairs throughout, especially above; leaves few, mostly near the base, 1–2 reduced ones above; petioles spreading-villous, very slender, 2–10 cm. long, somewhat vaginate at base; blades pentagonal-subreniform in outline, mostly 2–5 cm. broad, 3- or 5-fid about 2/3 their length into broad obovate segments with some scattered long hairs on both



surfaces and shallowly 2-3-lobed, each lobe with 2-few ovate-mucronate teeth to ca. 5 mm. long and 4 mm. wide; inflorescence open, simple or 1-branched, each with 1-3 flowers; lower bracts compound or trifid, 5-15 mm. long, the upper oblong-elliptic, 5-8 mm. long; pedicels 2-5 cm. long, spreading-villous and with some inflated glandular hairs; bracteoles elliptic, 4-6 mm. long, situated above the middle of the pedicel; flowers purple-violet with yellow hairs; upper sepal obovate, rounded above, 12-13 mm. long, 7-8 mm. wide, the spur decurved, 14-16 mm. long, 3 mm. wide at the base, rather acute; lateral sepals elliptic-ovate, 12-13 mm. by 9-10 mm., obtuse; lower sepals 13 mm. by 8 mm., subacute; petals black, the upper laminae quite oblique, entire, glabrous, 9 mm. long, 3 mm. wide, the spur ca. 13 mm. long; lower laminae oblong-ovate, ca. 4 mm. by 3 mm., bearded and long-ciliate, erose but not bifid, the claw 6 mm. long; stamens 5-6 mm. long, glabrous; anthers dark, 1 mm. long; follicles 3, erect, 13-14 mm. by 2.5 mm., spreading-pubescent, the styles 2.5 mm. long.

Caulis tenuis, 1-4.5 dm. altus, patulo-hirsutus, supra subglandulosus; folia pauca, subbasilaria; petioli villosi, valde tenues, 2-10 cm. longi, base subvaginati; laminae pentagonali-subreniformes, 2-5 cm. latae, 3-5-fid, segmenta 2-3-lobata, supra et infra sparse hirsuta; inflorescentia laxa, integra vel 1-ramosa, in quoque parte cum 1-3 floribus; bracteae inferiores trifidae, 5-15 mm. longae, superiores oblongo-ellipticae, 5-8 mm. longae; pedicelli 2-5 cm. longi, villosi et glandulosi; bracteolae ellipticae, 4-6 mm. longae; flores purpureo-violacei cum pilis aureis; sepala 12-13 mm. longa, 7-10 mm. lata, calcar 14-16 mm. longum, base 3 mm. latum; petala atra, laminae superiores obliquae, glabrae, integrae, 9 mm. longae, calcar 13 mm. longum; laminae inferiores oblongo-ovatae, 4 mm. longae, barbatae, ciliatae, erosae, unguis 6 mm. longus; stamina glabra; follicula 3, erecta, 13-14 mm. longa.

TYPE: Bhutan, Tonjsa, Oct. 3, 1914, *R. E. Cooper*, collector for Bulley 2294 (E) at 2600 m.

OTHER COLLECTIONS. **Bhutan:** Ridang Angduphorang, *Cooper* for Bulley 2024 (E); Chendebi, *Ludlow & Sherriff* 3519 (BM, E), 17065 (BM), 19578 (BM).

A collection from Nepal [Lulo Khola, *Polunin, Sykes & Williams* 3518, (BM)] seems near *Delphinium cooperi*, but has the lower petals divided. The proposed species suggests *D. stapeliosum*, but that species lacks glandular hairs.

194. *Delphinium corymbosum* Regel, Acta Horti Petrop. 7: 547. 1880; Gartenflora 1881: 23, 24. pl. 1059. 1881. FIG. 16, I.

? *Delphinium corymbosum* var. *baicalense* Huth, Bot. Jahrb. 20: 409. 1895.

Based on *Karelin & Kiriloff* 1841 (w) as *D. intermedium* var? I have not seen the Vienna specimen, if it is *Karelin & Kiriloff* no. 1164, it is *D. elatum*.

*Delphinium umbellatum* Regel ex Nevski in Komarov, Fl. U.S.S.R. 7: 155. 1937, in synonym.



Stem 3–6 dm. tall, retrorse-pilose, branched above forming a dense corymbose panicle, the stem leafy throughout; lower petioles dilated at the base, 1–1.5 dm. long, upper ones shorter; blades of leaves hairy on both sides, palmately 5-lobed, the lobes broadly cuneate, 3-lobulate at apex, the lobules coarsely crenate-dentate, the teeth callus-tipped; upper cauline leaves short petioled or sessile, palmately 3- or 5-lobed; branchlets of inflorescence with linear entire herbaceous bracts 10–15 mm. long; pedicels 3–7 cm. long; bracteoles linear, 10 mm. long; flowers 4–5 on side branchlets crowded in subumbellate fashion at the apex of the dense terminal raceme; sepals subequal, ovate or lance-ovate, 13–17 mm. long, 6–10 mm. wide, pale violet, greenish on back, hirsute, cucullate at apex; spur 8–10 mm. long, 3–4 mm. wide at base, hirsute, more or less incurved at the obtuse apex; upper petals blackish, the laminae emarginate, ca. 11 mm. long, glabrous, the spur 10.5 mm. long; lower laminae oblong-ovate, 7 mm. long, deeply cleft into oblong lobes, bearded below the lobes, long-ciliate, claw 7 mm. long; follicles 3, densely pubescent.

TYPE: Grown from seeds from alps of east Turkestan, sent by Dr. Akegel, June, 1881, ex horto bot. Petropolitano (LE); seen.

ILLUSTRATION. *Gartenflora* pl. 1059. 1881.

195. *Delphinium crassicaule* Ledeb. Fl. Rossica 1: 62. 1841. FIG. 16, J.

*Delphinium caucasicum* var. *chinense* Regel, Mem. Acad. Pétersb., VII. 4: 10. 1861. Based on a collection from Chinese Mongolia, Herb. Fischer; not seen.

Stem to 1 cm. thick in the type, leafy largely below, leafless above, pilose; leaves round in outline, 5- to 7-parted to well above the base, subglabrous to scattered-pilose, especially beneath, the segments cuneate, broad, incised to near the middle into lanceolate, acuminate lobes; raceme rather dense, many flowered; pedicels more or less divaricate, up to more than twice the length of the flower, more or less pilose; bracts lance-linear, long-pilose, entire, to 10 mm. long; bracteoles 2–3, lance-linear, somewhat shorter, located near the base of the flower; sepals blue, subglabrous without, the upper ovate, 12 mm. by 6 mm., acute, the spur slightly decurved, 17 mm. by 3 mm., narrowed rather rapidly to a rather pointed apex; lateral sepals rhombic-obovate, 12 mm. by 5 mm., the narrow apex somewhat recurved; petals dark, the upper laminae acute, ciliate, almost straight, ca. 10 mm. long, the spur ca. 5 mm. long; lower laminae almost straight, 5 mm. long, 2-toothed apically, hairy in distal part, claw 5 mm. long; stamens 6–7 mm. long, glabrous; anthers dark, oblong, 1 mm. long; follicles 3, glabrous.

TYPE: Eastern Siberia, between Wilnick and Olekminsk, *Kruhse* (LE); seen. The type specimen now has no flowers. Three sheets of the Bernhardt Herbarium (MO) seem to be this species; one labeled Ex Museo Berolinensi, June, 1818. Nevski (Fl. U.S.S.R. 7: 154. 1937) cites this species as a synonym of *D. crassifolium*, but the leaf lobes are much sharper.



196. *Delphinium crassifolium* Schrad. ex Spreng. Gesch. Bot. 2: 201. 1818, *nomen*; Ledeb. Fl. Rossica 1: 62. 1841. (A var. *compactum* Malysch was later printed on herbarium labels with a Latin diagnosis). FIG. 16, K.

? *Delphinium crassifolium* var. *tangutica* Maxim. Fl. Tangut. 1: 22. 1839; not known to me.

Perennial from a woody root; stem simple, scapose, slender, with scattered long spreading hairs and shorter glandular ones above, 3–7 dm. tall; petioles 7–15 cm. long, spreading-hairy, vaginate at base; leaf blades rounded angled in outline, 5–15 cm. broad, sparsely hairy on both sides, paler beneath, 5- or 7-parted into broad cuneate trifid segments, these with more or less oblong-ovate teeth or shallow lobes 4–10 mm. broad; racemes strict, 2–15 cm. long, several flowered; bracts lanceolate or narrower, to 10 mm. long; pedicels appressed to the axis, slender, pubescent, 1–5 cm. long; bracteoles lance-linear, 3–6 mm. long, from the middle of the pedicel to near the flower; sepals blue, scattered-pubescent; upper sepal 14–17 mm. long, ovate, obtuse, spur about as long, straight to somewhat curved; lateral sepals oblong, 14–15 mm. long, rounded at apex; lower sepals 16–18 mm. long, obtuse; petals black, the upper laminae almost straight, acute, entire, 10 mm. long, glabrous; lower laminae 5 mm. by 2 mm., cleft about 2 mm., with long white hairs on both sides toward the apex and on the margin, claw 6 mm. long, broad; stamens 6–7 mm. long, the base of the filaments much widened, glabrous; anthers dark, 1 mm. long; follicles 3, glabrous, reticulate; seeds squamate, 1.5 mm. long.

TYPE: Krasnijarsk, Turkestan?, Herb. Ledebour (LE); seen.

ILLUSTRATION. GMELIN, Fl. Sibirica 4: pl. 79. 1769.

REPRESENTATIVE SPECIMENS. In alpibus Sajanensibus, Radde (GH); var. *compactum* Malyshev, 2300 m., Mts. Sajanenses, Jugum Tunkenense Aug. 14, 1858 (BM, E, K); var. *stubendorffii*, Sibiria orientalis, leg. Stubendorff (K, in type cover) I have no record of publication; *crassifolium*, Sibir. media, in herbario Petropolitani (K); Mts. Sajan, Komarov in 1902 (P); Issyk-Kul, Songaria, Krasnow in 1886 (P).

197. *Delphinium cryophilum* Nevski in Komarov, Fl. U.S.S.R. 7: 146, 724. 1937. FIG. 16, L.

*Delphinium elatum* var. *intermedium* f. *hirsutum* Pohle in herb.

Perennial, the stem 2–6.5 dm. tall, to almost 10 mm. thick below, retrorsely soft hairy, the hairs 1–2.5 mm. long, rather equably leafy; petioles 5–10 cm. long, strongly dilated at base; laminae with long white hairs on both surfaces, to ca. 1 dm. broad, round-cordate in outline, parted almost to base into rhombic-cuneate parts which are more or less plainly shallowly 3-lobed in their distal portion, then with few deep teeth or lobules (lance-oblong, to almost 1 cm. long, 2–4 mm. wide, acute); central raceme 2–3 dm. long, thick-stemmed, many flowered, with 1 or 2 few flowered, very slender racemes near the base; bracts 1–3 cm. long, narrowly linear to



broadly lanceolate; pedicels spreading-hairy, erect, 1–4 cm. long; bracteoles linear-subulate, 4–5 mm. long, near the flower; sepals violet-blue, glabrous except for a few hairs near the apices, the upper sepal ca. 12 mm. by 6 mm., attenuate at tip, the spur spreading, 13–14 mm. long, 3.5–4 mm. wide at base, obtuse; lateral sepals obovate, 12–13 mm. long, 7–8 mm. wide, round-obtuse; lower sepals 11–12 mm. by 4–5 mm., attenuate; petals black, the upper laminae oblique, 10 mm. by 3 mm., short-bidentate, glabrous, the spur 11–12 mm. long; lower laminae yellow-bearded at base, 4–5 mm. long, bifid halfway into lance-oblong ciliate lobes, claw 5 mm. long; stamens 5 mm. long; carpels 3, glabrous.

TYPE: "In decliviis argillosis herbosis insulae Kolgujev, lg. *Pohle*, Aug. 23, 1902 (LE); seen.

198. *Delphinium duhmbergii* Huth, Bull. Herb. Boiss. 1: 330. *pl.* 16 (flower). 1893. FIG. 16, M.

*Delphinium iliense* Huth, Bot. Jahrb. 20: 402–3. 1895. No type stated. From LE was loaned as type: "Prope lacum Turnkul, flora iliensis, *Krassno* in 1886," originally identified as *D. caucasicum* var. *hirsutum*. *D. iliense* var. *pubiflorum* (cited by Huth) was, Möngötö, *Regel*, 1879, seen (κ); *D. iliense* var. *angustatum* (Huth, p. 403), no cited material seen; *D. iliense* var. *macrocentrum* (Huth, p. 403), a *Przewalski*, 1880, specimen from Kansu, China cited, not seen or identified; *D. iliense* var. *hispidum* (Huth, p. 403), no cited material seen.

*Delphinium englerianum* Huth, Bot. Jahrb. 20: 418. 1895. First specimen cited was Turkestan, Hissar, "in valle fluminis Jaquob," *Regel*, 1883 (LE, not seen, isotype E, seen). Huth had 3 vars.: var. *incisum* (p. 418), no type cited, opinion expressed it might be *D. incisum* Wall., which it cannot be if related to *D. duhmbergii*; var. *hoffmeisteri* Klotzsch, Reise Wald. 132. 1862; no specimen cited and I do not know the plant; var. *simplex* Huth (p. 418) which I cannot place.

*Delphinium turkestanicum* Huth, Bot. Jahrb. 20: 420. 1895. If the first of two specimens cited is taken as type (Aryslyn, 3000 m., *Regel*, 1879 (LE)), it belongs here, but has a few short bristles on upper petal lamina.

Perennial from a woody rhizome, stem slender, 1–8 dm. tall, hirsute below, tending to be glabrous to sparsely hirsute above, mostly leafy at the base or in lower half; lower petioles hairy, 5–20 cm. long, dilated at base, upper much shorter; leaf blades round-pentagonal in outline, subglabrous to hairy above, pilose beneath on veins and margin or on whole surface, 3–6 cm. broad, divided to below middle into cuneate, obovate segments 1–2.5 cm. broad, these shallowly lobed or coarsely toothed, the teeth ovate, mucronate; cauline leaves remote, the uppermost reduced, sessile; inflorescence racemose or thyrsoid, glabrous to pilose; bracts trifid or mostly lanceolate and entire, 5–12 mm. long, ca. 2 mm. wide; pedicels ascending, 1–3.5 mm. long; bracteoles lanceolate, ciliate, membranous, bluish, 5–7 mm. long, subtending the flower; sepals mostly blue, glabrous to pubescent; the upper sepal ovate, 13–15 mm. long, 8–10 mm. wide, acutish, the spur almost straight, about as long as sepals, 3 mm. wide at base, narrowed to



a sharp point; lateral sepals round-ovate, 13–15 mm. long, 10–11 mm. wide, rounded-obtuse; lower sepals 12 mm. by 7 mm., acute; petals almost black, the upper laminae oblique, glabrous or with a few short bristles on the face, bidentate, ca. 10 mm. long, the spur 16–17 mm. long; lower laminae oblique, ovate, 4.5 mm. by 3 mm., cleft ca. 2.5 mm. into somewhat erose lobes with very long cilia and very long hairs at base of lamina, claw 5.5 mm. long; stamens 6–7 mm. long, glabrous; anthers dark, 1.2 mm. long; follicles 3, glabrous to hirsute, to 10 mm. long; seeds triquetrous, winged.

TYPE: Altai Mts., Siberia, *Dukhberg* in 1881 (B), not seen. At Kew are 3 sheets "teste Huth": Turkestan, Dschungarischer Alatau, *Regel* in 1878, and Dschagartai, *Regel* in 1877. These I would use as representative of the species. The third sheet is the Möngötö collection cited above under the discussion of the name *iliense*.

REPRESENTATIVE SPECIMENS. *Asia Media*: *Lipsky* 1783 (BM); *Turkestan*: *Regel*, July 18, 1877 (LE); Alatau, *Karelin & Kiriloff* 1164 (NY, P); Issinsul, *Regel*, Aug., 1877 (K); Tianschan, *Merzbacher* 723 (US); Terskei Alatau, *Artemjev* 4266 (BM, E, K); Koksü Valley, *Littledale* (K).

199. *Delphinium dyctiocarpum* DC. Syst. 1: 360. 1817. FIG. 16, N.

*Delphinium dictyocarpum* Steud. Nom. ed. II. 1: 488. 1840.

*Delphinium ciliatum* Stev. var. *dictyocarpum* Huth, Bot. Jahrb. 20: 404. 1895.

*Delphinium dyctiocarpum* var. *glaberrimum* Trautv. Bull. Soc. Nat. Mosc. 33: 81. 1860. I have not seen type. The variety is reduced to synonymy by Nevski in Komarov, Fl. U.S.S.R. 7: 159. 1937.

Perennial from a woody root, the stem 6–15 dm. tall, erect, leafy, robust, glabrous or nearly so, often purplish, mostly simple; lower petioles to ca. 2 dm. long, scarcely dilated at the base, the upper much shorter; leaf blades rounded-pentagonal in outline, the upper ca. 4 cm., the lower ca. 15 cm. broad, subglabrous above except for a few appressed hairs on the veins, strigose or pilose beneath especially on the veins, 3- to 7-parted to within 1 or 2 cm. of the base, the lower part of the segments subcuneate, entire for 1–3 cm. then widening into broad parts that are pinnately incised into lanceolate teeth or lobes to almost 2 cm. long and mostly 2–4 mm. wide, subacuminate; inflorescence a dense raceme or open panicle of racemes, many flowered, nearly or quite glabrous; bracts mostly entire (the lowest trifid), subsetaceous, 5–15 mm. long; pedicels divaricate to suberect, 1–3 cm. long; bracteoles lance-linear to setaceous, 3–7 mm. long, placed well below the flower; sepals violet-blue, glabrous or sometimes minutely strigulose; upper sepal 10–12 mm. long, ovate, acutish, the spur straight, 12–20 mm. long, 2.5–3 mm. wide at base, narrowed to a slender apex; lateral sepals 12 mm. long, 7 mm. wide, elliptic-oblong, with rounded apex; lower sepals 12–14 mm. long, 6 mm. wide, more pointed; petals dark, the upper slightly oblique, the laminae 8–9 mm. long, glabrous, bidentate, the spur 12–24 mm. long; lower laminae strongly oblique, hairy,



ovate-oblong, 4.5 mm. long, cleft half its length, the claw broad, 6 mm. long; stamens 5–6 mm. long, glabrous; anthers dark, 1 mm. long; follicles 3, glabrous (ciliate on suture when young), suberect, 10–14 mm. long, 4–5 mm. wide, the styles an additional 3.5 mm.; seeds brown, angled, ca. 2 mm. long, winged on the angles.

TYPE: A cultivated specimen from Siberia (G?); not seen.

EXAMPLES. **Cultivated:** Ithaca, N. Y., *Dress* 8603 (BH); Cambridge, Mass. in 1901 (BH); Kew, *Nelmes* 804 (BH); ex herbario horti Petropolitani, *Karkoraly* in 1862 (MO, NY). **Wild:** Altai, *Schrenk* (GH, K); Altai occident., *Titov* (NY); Altai borealis, *Burdakova* in 1931 (NY); Songoria, *Schrenk*, ex herb. Trautv. July, 1843 (K).

200. *Delphinium elatum* L. Sp. Pl. 1: 531. 1753. FIG. 16, O; 17, A, B.

*Delphinium palmatifidum* DC. Syst. 1: 358. 1817, and probably vars. *hispidum* and *glabellum* of same reference and based in part on Gmelin, Fl. Sibirica 4: pls. 79 and 75, respectively. This reference and the next three are treated as synonyms of *D. elatum* by Nevski, Fl. U.S.S.R. 7: 147. 1937.

*Delphinium glabellum* Turcz. Bull. Soc. Nat. Mosc. 10: 56. 1837, *nomen*.

*Delphinium alpinum* Huth, Bot. Jahrb. 20: 405. 1895, *pro parte*, not same as Waldst. & Kit. Pl. Rar. Hung. 3: 273. 1812, European. Possibly *D. alpinum* vars. *ajanense* Huth and *productum* Huth, *loc. cit.* 406.

*Delphinium discolor* Fisch. ex Sweet, Hort. Brit. ed. II. 9. 1830, *nomen*.

*Delphinium elatum* subsp. *palmatifidum* (DC.) Sergievsk, Animadvers. Syst. Univ. Tomsk 1930: 3 and vars. *glabellum* (DC.) and *hispidum* (DC.), and *glabrum* Sergievsk.

? *Delphinium elatum* subsp. *subglabrum* Ledeb. Fl. Ross. 1: 64. 1841.

? *Delphinium elatum* subsp. *intermedium* (Soland.) Fleisch & Lindm. Bull. Acad. Polon. Sci. & Lett. Cl. Math. Nat. 1933: 96. 1934.

*Delphinium intermedium* DC. Prodr. 1: 55. 1824. Based on a European type.

? *Delphinium elatum* var. *longicalcaratum* Huth, Bot. Jahrb. 20: 398. 1895. Type, "Sibiria pr. fl. Jenisei," *Lessing* (B); not seen.

? *Delphinium atropurpureum* Pall. Reise Statth. Russ. Reich. 1: 134. 1771. Apparently a name used later for cultivated plants only.

*Delphinium korshinskyanum* Nevski in Komarov, Fl. U.S.S.R. 7: 153, 724. 1937. Type, "Inter fl. Zeja & Bureja, near Ivavovskoje," *Korshinsky*, July 11, 1891 (LE); seen.

? *Delphinium elatum* var. *sericeum* W. T. Wang, Acta Bot. Sinica 10: 81. 1962. Said to be glandular puberulous in the inflorescence, from Sinkiang province, China. I have seen no material and doubt its relationship to the *D. elatum* complex.

Perennial from a woody rhizome, stem 5–20 dm. tall, glabrous to spreading- or retrorse-villous, rather robust, simple below, simple or branched in the inflorescence, leafy, the leaves only gradually reduced upward; basal petioles to 2 dm. long, membranous-dilated at base, glabrous to hairy, the cauline shorter and scarcely dilated below; blades mostly 5–15 cm. broad, more or less rounded-pentagonal in outline, subglabrous to hairy, mostly 5- or 7-parted to within about 1 cm. from the base, the segments broad, cuneate at base, ovate, incised or deeply toothed to lobed



with 2–3 coarse terminal teeth 8–20 mm. long, 8–10 mm. wide; inflorescence of subglabrous to hairy racemes solitary at end of each stem, the flowers many, crowded; bracts leaflike and divided or the upper entire, linear, to ca. 1 cm. long; pedicels ascending, mostly 1–3 cm. long; bracteoles linear, 4–6 mm. long, near to flower or above the middle of the pedicel; flowers pale blue to dark blue, the sepals glabrous or ciliate or more or less pubescent without; upper sepal ovate, 12–16 mm. long, subobtusate, the spur about as long or longer, stout, 3–3.5 mm. wide at base, straight or decurved, blunt; lateral sepals mostly 12–16 mm. long, 8–10 mm. wide, rounded at apex; lower about as long, narrower, obtuse; petals almost black or of same color as sepals, the upper laminae suberect, ca. 8 mm. long, bidentate at the glabrous or sparsely bristly apex; lower laminae oblique, long-bristly, 4 mm. by 2 mm., shallowly bilobed, the claw 6 mm. long; stamens 5 mm. long, glabrous, strongly dilated; anthers dark, 1 mm. long; follicles 3, glabrous, 12–15 mm. long, the styles an additional 3 mm.; seeds dark, winged on angles, 2–3 mm. long.

TYPE: Specimen in Hort. Cliff. Herb. (BM) from Silesia; seen.

RANGE. Widely distributed in mountains from central Europe across northern Siberia.

ILLUSTRATIONS. HEGI, Ill. Fl. Mittel-Eur. 3: *pl.* 114. 1909; Bot. Reg. *pl.* 1963. 1837.

COLLECTIONS SEEN. **Siberia orient.:** *Dr. Merk*, Herb. Pallas (BM); **Siberia subalpina**, *Jacquin* 1773 (BM); **W. Siberia:** *Mamlev* 211 (K, US), *Stabindorff* (F); Lake Baical, *Radde* (K, P); **Iter Ircutense**, *Kusnezow* 885 (MICH), Irkutsk, *Besser* (K); **Transbaicalia**, *Enander* 7–19–1914 (E); **Mongolia**, *Ikonnikov-Galitzky* 2915 (MO); **Soongaria**, *Karelin & Kiriloff* 1168 (BM, K in part, P); **Altai**, *Ledebour* (K, P), *Borgand* (GH); **Ochotsk Sea**, *C. Wright* (GH, K, NY, US); **Dahuria**, *Turczaninow* in 1828 (UC), *Fischer* in 1842 (P); **Jenissei**, *Tolmatchew* 174 (GH), *Brenner* in 1876 (US).

A variable species as here recognized. Pawlowski (Fragmenta Flor. & Geobot. 9: 429. 1963) recognizes subspecies *intermedium* and others, but I do not feel that I understand *D. elatum* well enough to do so. I have seen cultivated material under many names: *D. formosum*, *D. caucasicum*, *D. decorum*, *D. bicolor*, *D. intermedium* and *D. cuneatum*.

201. **Delphinium elbursense** Rech.f. Anz. Österr. Akad. Wiss. Math.-Nat. 88: 223. 1951. FIG. 17, C.

Perennial from a rhizome; stem to 6 dm. tall, simple or short branched in the inflorescence, sulcate-striate, with long soft spreading hairs below, deflexed-strigose above, leafy to inflorescence; leaves rather numerous, petioles more or less villous, the lower to 1 dm. long, somewhat dilated at the base, the upper shorter; leaf blades sparsely strigose or with looser hairs on veins, broadly round-cordate, the lower to 12 cm. across, gradually smaller up the stem, 5-parted to within 1 or 2 cm. from the base into cuneate-obovate segments, these incised into lance-oblong teeth or lobes mostly 2–4 mm. wide, obtuse to acute, thickened at apex; inflorescence a



rather open raceme 1–3 dm. long, with or without supplementary branches below, densely strigose; bracts trifid or entire and lanceolate, 1–2 cm. long, pubescent; pedicels 1–3 cm. long, ascending; bracteoles 2, lance-linear, near the flower; sepals deep blue, crisp-villous without, with some long loose hairs within; upper sepal ovate, 15–17 mm. long, 10 mm. wide, obtuse, the spur usually slightly curved, 18–20 mm. long, ca. 4 mm. wide at base, narrowed to an acute apex; lateral sepals broadly rhombic-obovate, 20 mm. long, 15 mm. wide, rounded-obtuse; lower sepals elliptic, 18 mm. by 10 mm., acute; petals dark, the upper laminae bidentate, slightly oblique, glabrous, 11 mm. long, the spur 11–12 mm. long; lower laminae somewhat oblique, 5 mm. long, 4 mm. wide, deeply cleft into 2 oblong-lanceolate divaricate, bearded and ciliate lobes, claw 6 mm. long, not appendaged; stamens 6–7 mm. long, glabrous; anthers dark, 1–2 mm. long; follicles 3, pubescent.

TYPE: Iran, prov. Gorgan (Asterabak), Mt. Shahvar near Hadjilang, 2400–2600 m., *K. H. & F. Rechinger 6093a*, July 27, 1948 (w) not seen; isotypes (BH, MO, UC, US) seen.

Possibly too near *D. speciosum*, but perhaps a local entity recognizable by the pubescence.

202. *Delphinium elisabethae* N. Busch, Acta Inst. Bot. Acad. Sci. U.S.S.R. I. fasc. 3: 355. 1937. FIG. 17, D.

Stem perhaps 1 m. tall, retrorse-strigulose and with some spreading hairs, these more numerous and mixed with glandular ones in the inflorescence, stem leafy; cauline petioles 1–6 cm. long, scarcely dilated at base; leaf blades 4–10 cm. broad, green and sparsely strigulose above, paler and more pubescent beneath, deeply 5-fid into rather narrow segments (1–2 cm. wide), these lacinate ca. halfway to midrib into lance-linear lobules and teeth 1–4 mm. wide, 2–15 mm. long; inflorescence densely yellow-glandular, branched at base, side branches with rather compact, few-flowered racemes, central raceme lax, to 2 dm. long; lowest bracts foliose, others lance-linear, pubescent, 5–12 mm. long; pedicels divergent, glandular, 2–5 cm. long; bracteoles ca. 2 mm. long, near the flowers; sepals pale blue, to whitish striped, more or less glandular and pubescent; upper sepal oblong-ovate, 13 mm. long, 5 mm. wide, obtuse, the spur spreading decurved, 10–14 mm. long, 2.5 mm. broad at base; lateral sepals oblong-elliptic, 11 mm. by 5 mm., rounded at apex; lower sepals 14 mm. by 4 mm.; petals black, the upper laminae somewhat oblique, 8 mm. long, glabrous, emarginate, the spur 10 mm. long; lower laminae round-ovate, 5 mm. in diameter, bearded near base, sparsely so on the 2 lobes, claw 5 mm. long; stamens 6–7 mm. long; anthers dark, 1 mm. long; carpels 3, glabrous.

TYPE. Transcaucasia (Ossetia Meridionali) near Sredneje Sba, Aug. 19, 1933, *Eliz. Busch* (LE) seen.

ANOTHER SPECIMEN. South Ossetia: *E. & N. Busch*, Aug. 6, 1935 (BM).



203. *Delphinium elliptico-ovatum* W. T. Wang, Acta Bot. Sinica 10: 83. 1962.

Stem ca. 7 dm. tall, 3 mm. thick at base, sparsely retrorse-hirsute, few branched above, equably leafy; median cauline leaves long petioled, blades as in *D. naviculare*, ca. 5.7 cm. long, 8 cm. wide, 3-parted to 8 mm. from the base, the middle part obovate-rhombic, acuminate, 3-lobed to middle, strigulose on both surfaces; petioles slightly longer than blades, not or scarcely vaginate at base, with the pubescence of the stems; racemes 7-8-flowered, rather lax, the axes loosely retrorse-strigulose; basal bracts trifid, others lanceolate or elliptic-ovate, 8-12 mm. long, 2-2.5 mm. wide; pedicels 1-2.7 cm. long, densely retrorse-strigulose, divergent; bracteoles 1-7 mm. remote from the flower, 5.5-7 mm. long, 2-3 mm. wide, acuminate, strigulose; sepals blue-purple, 10-13 mm. long, strigulose; spur 12-13.5 mm. long, cylindro-subulate, 2-2.5 mm. thick, slightly decurved; petals black, the upper laminae puberulent at apex, the lower round-ovate, bilobed, with triangular lobules, long-ciliate at end, yellow- and white-bearded at base, claw appendiculate, longer than the limb; stamens glabrous; follicles 3, loosely puberulent to glabrous, 9 mm. long, the styles an additional 2.5 mm.; seeds triquetrous, 1.5 mm. long, scaly-laminate.

TYPE: Sinkiang, Wen Chuan, *K. C. Kuan* 3858, Aug. 28, 1957 (PE); not seen. I have seen no material of this species. It is supposed to be near to *D. retropilosum* (Huth) Sambuk, in which the leaves are basally somewhat cuneate, the sepals densely strigulose.

204. *Delphinium flexuosum* Marschall Bieberstein, Fl. Taur. Cauc. 2: 12. 1808. FIG. 17, E.

*Delphinium ciliatum* Stev. Ind. Sem. Hort. Dorpat (1811) ex Bieb. Fl. Taur. Cauc. 3: 370. 1819. A specimen from Narzana (Nartsana) labelled *D. ciliatum* Stev. (κ) has been seen.

? *Delphinium flexuosum* vars. *brevipila* Busch and *hirsuta* Busch in Fl. Cauc. Crit. III. 3: 67. 1902.

*Delphinium elatum* var. *subciliatum* Ledeb. Fl. Rossica 1: 64. 1842. A new name for *D. flexuosum* and *D. ciliatum*.

? *Delphinium flexuosum* vars. *dasyanthum* and *lasiocarpum* Rupr. Fl. Cauc. 34, 35. 1869.

Perennial from a woody rhizome with strong fibrous roots; stem flexuous, robust, 4-8 mm. thick, striate, reddish, spreading-hairy to subglabrous, 6-10 dm. tall, leafy, simple or branched above; petioles subglabrous to hairy, dilated at base, the lower to 1 dm. or more long, the upper almost suppressed; leaf blades pentagonal in outline, broader than long, 3-10 dm. broad, glabrous to villous on both surfaces, paler beneath than above, parted to one cm. or so above the base into segments with rather parallel sides near the base, then more or less ovate and trifid or incised into teeth or shallow lobes sublanceolate in shape, acute; inflorescence a dense many-flowered raceme or an open panicle of racemes, glabrous to hairy; lower bracts leafy, trifid, the upper entire, lance-linear, 5-20 mm. long; pedicels



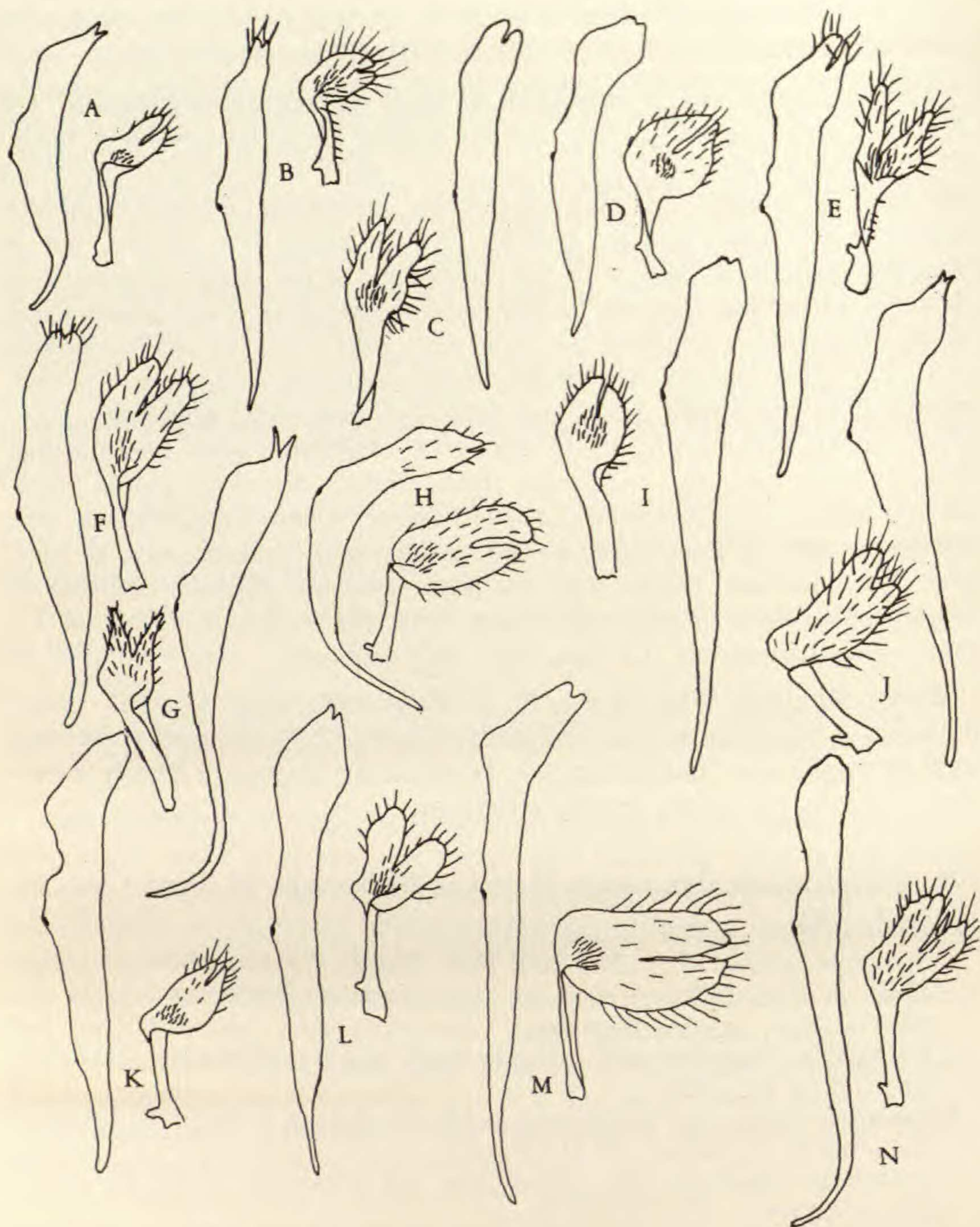


FIGURE 17. *Delphinium*, GROUP IX. Petals, the upper spurred, the lower clawed. A. *D. elatum*; upper lamina 8 mm. long, spur 8 mm.; lower lamina 3.5 mm. long, claw 6 mm.; drawn from Nilsson in 1898 (us). B. *D. elatum*; upper lamina 8 mm. long, spur 12 mm.; lower lamina 4 mm. long, claw 6 mm.; drawn from Korshinsky on the Amur (us). C. *D. elbursense*; upper lamina 11 mm. long, spur 12 mm.; lower lamina 5 mm. long, claw 6 mm.; drawn from Reckinger 6093a (uc). D. *D. elisabethae*; upper lamina 8 mm. long, spur 10 mm.; lower lamina 5 mm. long, claw 5 mm.; drawn from Elizabeth Busch in 1933, TYPE (le). E. *D. flexuosum*; upper lamina 9 mm. long, spur 15 mm.; lower lamina 6 mm. long, claw 5 mm.; drawn from Grossheim & Schiskin 333 (ny). F. *D. formosum*; upper lamina 11 mm. long, spur 12 mm.; lower lamina 6 mm. long, claw 6 mm.; drawn from Balls 496 (k). G. *D. hillcoatiae*; upper lamina 11 mm. long, spur 17 mm.; lower lamina 4.5 mm. long, claw 5 mm.; drawn from



divaricate, 5–15 mm. long; bracteoles lance-linear, 4–8 mm. long, subtending the flower; sepals blue, glabrous to villous; upper sepal ovate, 13–15 mm. long, 7–8 mm. wide, acute, the spur almost straight, 15–18 mm. long, 3.5–4 mm. wide at base, narrowed to an acute tip; lateral sepals rounded-ovate, 12 mm. by 8 mm., obtuse; lower sepals 13–14 mm. long, 6–7 mm. wide, subacute; petals dark, the upper laminae slightly oblique, 9 mm. long, bidentate, pilose or glabrous, the spur ca. 15 mm. long; lower laminae only slightly oblique, the blade 6 mm. long, long bearded and ciliate, the lance-oblong lobes divaricate, claw 5–6 mm. long; stamens 6–7 mm. long, a few hairs along the margin of the filaments; anthers dark, 1 mm. long; follicles 3, glabrous, divergent, 7–8 mm. long, the styles 2.5 mm. long; seeds triquetrous, 1 mm. long, dark, squamate.

TYPE: No specimen cited, but from LE one was loaned me, from the Caucasus, Mt. Berchtau, *Steven*, ex Herbario Marschall Bieberstein, labelled TYPE; there are photographs at (A, K). Another specimen in the Leningrad loan was "In herbidis montosis circa acidulam Nartsana, 3500', August 9, 1829," no collector given, labeled *D. flexuosum*.

ILLUSTRATIONS. TREVIRANUS, Delph. & Aquileg. Obs. *pl.* 1. 1817 and Bieberstein, Cent. Pl. Rar. 2, II:64. 1843, according to Index Londinensis.

REPRESENTATIVE SPECIMENS. Transcaucasia: prov. Tiflis, *Grossheim & Schiskin* 333 (BM, K, NY); Mt. Kochta, *Wissjulina* in 1928 (BH); Azerbajdzhan, *Karjagen* in 1935 (BH); Funtel flum., Kchetiuscaja, *Busch* in 1903 (K); in Caucaso iberico lectum, dedit *Steven* Jan., 1821 (K).

205. *Delphinium formosum* Boiss. & Huet, Diagn. sér. II. 5: 13. 1856.  
FIG. 17, F.

*Delphinium formosum* var. *centiflorum* Huth, Bot. Jahrb. 20: 411. 1895.  
Huth cited *Balansa* from "Vallée alpine de Djimil (Lazistan), 2000 m.," this is 1352 (A, K, P) from northeast Turkey.

Perennial, 1–2 m. tall, the stem thick, ridged, pilose below, glabrous above, branched above, equably leafy; leaves subglabrous, 5- or 7-parted to ca. 1 cm. from base, the divisions broadly cuneate-obovate, incisely serrate into teeth or short lobes 3–10 mm. wide; cauline petioles to 1 dm.

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*Ludlow & Sherriff* 2424 (BM). H. *D. himalayae*; upper lamina 10 mm. long, spur 12 mm.; lower lamina 8 mm. long, claw 6 mm.; drawn from *Sharma* 117 (E). I. *D. lacei*; upper lamina 8.5 mm. long, spur 19 mm.; lower lamina 4.5 mm. long, claw 5 mm.; drawn from *Lace* 6012 (E). J. *D. leptopogon*; upper lamina 9 mm. long, spur 19 mm.; lower lamina 9 mm. long, claw 6 mm.; drawn from *Harry Smith* 7109 (A). K. *D. maackianum*; upper lamina 11 mm. long, spur 16 mm.; lower lamina 5 mm. long, claw 5.5 mm.; drawn from *James* in 1886 (GH). L. *D. mariae*; upper lamina 12 mm. long, spur 13 mm.; lower lamina 5 mm. long, claw 6.5 mm.; drawn from *Alexeenko* in 1898, TYPE (LE). M. *D. megalanthum*; upper lamina 13 mm. long, spur 16 mm.; lower lamina 9 mm. long, claw 6.5 mm.; drawn from *Lipsky* in 1892, TYPE (LE). N. *D. mirabile*; upper lamina 10 mm. long, spur 17 mm.; lower lamina 5 mm. long, claw 6.5 mm.; drawn from *Bunge* in 1839 (MO).



long, scarcely dilated at base; upper leaves 3- or 5-parted, reduced, subsessile; inflorescence paniculate, the central raceme densely many flowered, 1-3 dm. long; bracts lanceolate, 1-2 cm. long, entire, or the lowest trifid and larger; pedicels divaricate, 1-5 cm. long, glabrous; bracteoles opposite, ovate to lanceolate, 5-12 mm. long, glabrous, reaching the base of the flower or not; sepals violet-blue, broadly to oblong-ovate, 2-3 cm. long, pubescent to glabrous without and within, the margins ciliate; spur straight or slightly curved, 12-15 mm. long, 4 mm. wide at base, rapidly narrowed; petals black-purple, the upper laminae somewhat oblique, 11 mm. long, somewhat pilose at apex, spur 12 mm. long; lower laminae bifid, yellow bearded, ca. 6 mm. long, ciliate, the claw 6 mm. long; stamens 6-7 mm. long; anthers bluish, 1 mm. long; young follicles glabrous in type collection at Kew, sometimes short-pubescent, divergent in maturity, 12-15 mm. long, 4-5 mm. wide, the styles 3-4 mm. long; seeds brown, almost 2 mm. long, covered with horizontal rows of scales.

TYPE: "Cerca Maadenkhan inter Erzeroum et Baibout," Armenia, *Huet du Pavillon*, 1843 (G) not seen, (BM, K) seen; photo. (BH).

RANGE. Said to grow on coarse limestone scree, rocky slopes, 1500-2790 m., Turkey, Georgia.

ILLUSTRATIONS. *Fl. des Serres* II. *pl.* 1185. 1857; *Rev. Hort.* IV. 8: 528. 1859; *Gartenflora* 8: *pl.* 253. 1859.

REPRESENTATIVE COLLECTIONS. Turkey: *E. K. Balls* 1975, 496; *Davis* 21122, 21211; *Sinten* 1590; *du Parquet* in 1886. Cultivated as *D. formosum*, *D. formosum coelestinum*; *D. grandiflorum*.

✓ 206. *Delphinium hillcoatiae* Munz, sp. nov.

FIG. 17, G.

Perennial from a woody root, the stem simple or branched from base, often more or less purplish, ridged, with short spreading glandular hairs, quite leafy throughout, 1.5-5 dm. tall, the leaves gradually reduced upward; petioles hairy, 2-8 cm. long, dilated at base; laminae viscid, more or less cupped, not pressing flat, 2-4 cm. long, 4-10 cm. wide, subcuneate at base, parted to within 1 cm. from base into subrhomboid segments, these mostly 3-lobed ca. halfway to the midrib, then each lobe with ca. 3 oblong-ovate teeth 5-6 mm. long and wide, or in upper leaves in turn divided into smaller narrow lobules; raceme terminal, simple, 1-3 dm. long, glandular, spreading-pubescent, 4- to 20-flowered; lower bracts reduced leaves, the upper simple and entire; pedicels divergent, stiff, straight, 1-5 cm. long; bracteoles subtending the flowers, lance-linear, 5-7 mm. long; sepals glandular, white tinged green and with green tips, the spur pale green; upper sepal ovate, 18-19 mm. long, 9-11 mm. wide, apiculate, the spur 20-25 mm. long, 3.5-4 mm. wide at base, spreading decurved; lateral sepals narrowly oblong-obovate, 14-15 mm. by 4-6 mm., apiculate; lower sepals oblong-ovate, 14-15 mm. long, 5-6 mm. wide, apiculate; petals dull velvety black, the upper laminae somewhat oblique, 10-12 mm. long, 3 mm. wide, with 2 narrow lobules 1-1.5 mm. long, the spur 17-20 mm. long; lower laminae subovate, 5 mm. by 2.5-3 mm.,



somewhat bearded from near base to tip, bifid about  $1/3-1/2$  its length into lanceolate lobes, the claw 5 mm. long, not appendaged; stamens 6–7 mm. long; anthers dark, 1 mm. long; carpels 3, glabrous.

Perennis de radice lignosa; caulis simplex vel base ramosus, glanduloso-hirsutus, 1.5–5 dm. altus, foliosus; petioli hirsuti, 2–8 cm. longi, base dilatati; laminae foliorum viscidae, 2–4 cm. longae, 4–10 cm. latae, base subcuneatae, profunde partitae; segmenta subrhomboidea, 3-lobata, lobis dentatis; racemus terminalis simplex, 1–3 dm. longus, glanduloso-pubescens, cum 4–20 floribus; bracteae simplices, integrae vel inferiores lobatae; pedicelli divergentes, 1–5 cm. longi; bracteolae lanceo-lineares, 5–7 mm. longae, florem subtendentes; sepala glandulosa, albida, sepalum superiore ovatum, 18–19 mm. longum, 9–11 mm. latum, apiculatum, calcar 20–25 mm. longum; sepala lateralia anguste oblongo-obovata, 14–15 mm. longa; sepala inferiora oblongo-ovata, 14–15 mm. longa; petala subatra; laminae superiores subobliquae, 10–12 mm. longae, acute lobulatae; laminae inferiores subovatae, 5 mm. longae, barbatae, bifidae, unguis 5 mm. longum; carpella 3, glabra.

TYPE: Kap, Chayul Chu, S. Tibet, July 23, 1936, at 11000', on open dry stony hillside, *Ludlow & Sherriff 2424* (BM).

ADDITIONAL MATERIAL. Tibet: Chayul Dzong, slate screes in Nye Chu Valley, 3700 m., Sept. 21, 1935, *Kingdon Ward 12370* (BM).

It is a pleasure to dedicate this species to Miss Dorothy Hillcoat of the Department of Botany, British Museum (Natural History), whose interest in the genus *Delphinium* was most useful to me in my work at that institution.

207. *Delphinium himalayae* Munz, sp. nov.

FIG. 17, H.

*Delphinium himalayense* Chowdhury ex Mukerjee, Bull. Bot. Surv. India 2: 293–296. 1960, *nomen*.

Perennial, the stem 4–6 dm. tall, simple, slender, more or less retrorse-strigulose throughout, more densely so in the inflorescence; leaves few, largely near the base; petioles 1–2.5 dm. long, dilated at the base; leaf blades to 1 dm. broad, minutely strigulose on both surfaces, but more heavily so beneath, 5-fid to within 1 cm. from the base and the 2 outer segments immediately divided to make 7, these cuneate-obovate, bisect or trisect to ca. the middle, then each part lobulate into few lance-oblong lobules to 1 cm. long and 2–3 mm. wide, mucronate; inflorescence a secund several-flowered raceme 1–1.5 dm. long; lower bracts foliose, others lanceolate to oblong, 1–2 cm. long, conspicuous; pedicels erect, 1–3 cm. long; bracteoles subtending the flower, oblong-linear, 6–10 mm. long; sepals purplish blue, strigose, the upper broadly ovate, 17–18 mm. long, 15–16 mm. wide, obtuse, the spur often suberect, 13–15 mm. long, 4 mm. wide at the base, only gradually narrowed to an obtuse tip; lateral sepals ovate, 14–17 mm. long, 10 mm. wide, subacute; lower sepals asymmetri-



cally ovate, 15 mm. by 12 mm., subacute; petals black, the upper laminae 10–11 mm. long, 4 mm. wide, slightly oblique, bidentate and somewhat bristly at the apex, the spur 13–14 mm. long; lower laminae oblong, 8–10 mm. long, bifid about halfway with 2 linear-oblong lobes and more or less hairy, the claw 6 mm. long, appendiculate; stamens 6–7 mm. long; anthers dark, oblong, 1.5 mm. long; carpels 3, densely pubescent.

Perennis; caulis 4–6 dm. altus, simplex, tenuis, retrorso-strigulosus; folia pauca, vulgo basalia; petioli 1–2.5 dm. longi, base dilatati; laminae foliorum 5–10 cm. latae, strigulosae, 5-fidae; segmenta cuneato-obovata, trisecta, tum lobulata; inflorescentia secunda, racemosa, 10–15 cm. longa; bracteae infimae foliosae, superiores lanceolatae vel oblongae, 1–2 cm. longae, conspicuae; pedicelli erecti, 1–3 cm. longi; bracteolae oblongo-lineares, 6–10 mm. longae, florem subtendentes; sepala purpureo-caerulea, strigosa; sepalum superiore late ovatum, 17–18 mm. longum, 15–16 mm. latum, obtusum, calcar saepe suberectum, 13–16 mm. longum, base 4 mm. latum; sepala lateralia ovata, 14–17 mm. longa, subacuta; sepala inferiora ovata, 15 mm. longa, 12 mm. lata; petala atra, laminae superiores 10–11 mm. longae, parum obliquae, bidentatae, leviter setosae, calcar 13–14 mm. longum; laminae inferiores oblongae, 8–10 mm. longae, bifidae, lobis lineari-oblongis, villosis, unguis 6 mm. longus, exappendiculatus; stamina 6–7 mm. longa, glabra; carpella 3, pubescentia.

TYPE: Nepal, *Ser Oive Wigram* 118, in 1927 (E).

RANGE. The proposed new species, *Delphinium himalayae*, grows in grassy places at ca. 3000 to 4500 m. in Nepal.

EXAMPLES. Nepal: Langdeng, *Sharma* 117 (BM, E); Pongsing, *Dhwoj* 122 (BM, E); below Mugu, *Polunin, Sykes & Williams* 5290 (BM); Ghurchi Lekh, *Polunin, Sykes & Williams* 5128 (BM); Maharigaon, *Polunin, Sykes & Williams* 264 (BM); Chutta, *Polunin, Sykes & Williams* 4885 (BM); Balangra Pass, *Polunin, Sykes & Williams* 2503 (BM); Langtang Village, *O. Polunin* 1489 (BM), 555 (BM); Chilime Kharka road, *Polunin* 1413 (BM); Kyangjin Ghyang, *Polunin* 1778 (BM).

I have had no contact with Dr. Chowdhury and do not know why he never published *Delphinium himalayense*, the name which appears on some herbarium material in Great Britain. Since I do not know what his species was supposed to include, I do not feel free to use his name, taken up by Mukerjee, but never validly published. My concept of *Delphinium himalayae* is entirely my own, as are the description and citation of herbarium material.

208. *Delphinium inconspicuum* Sergievsk. Animadvers. Syst. Herb. Univ. Tomsk 1930. (3–4): 6. fig. 1930.

Stems many, 2.5–10 dm. tall, leafy throughout, short glandular-pubescent, more so upward; leaves orbicular-cordate or -reniform, 4.5–7 cm. long, 5–14 cm. wide, coarsely toothed, short pilose on both surfaces; raceme simple or few branched below, dense, 3–17 cm. long; lower bracts



large, leaflike; bracteoles linear, 0.5 mm. wide; inflorescence pilose and glandular; sepals blue, 8–18 mm. long, 5–9 mm. wide, spur 11–13 mm. long, 2.5 mm. wide at base; petals dark, upper laminae bidentate, glabrous; lower laminae semibifid with unequal oblong lobes, ciliate, the claw hirsute; carpels 3, glabrous; seeds winged.

TYPE: Semipalatinsk in jugo Narymense; not seen. The species apparently occurs also in Mongolia. *Delphinium inconspicuum* seems, from the meager description, to key out near *D. afghanicum* of Afghanistan and *D. pyramidatum* of Transcaucasia, but is far removed from them geographically.

209. *Delphinium kawaguchii* Tamura, Acta Phytotax. & Geobot. Kyoto 15: 194. fig. 2. 1954.

Leaves radical; petioles 16–20 cm. long, pilose, the blades reniform, 7 cm. long, 9 cm. wide, 3–5-fid, the lobes pinnately incised-lobed, pubescent on both surfaces on veins and margins; inflorescence racemose, 3–4 dm. long, 18–23-flowered; lower bracts trifid, upper entire, linear-oblong; pedicels 2–3.5 cm. long; sepals blue, pubescent, the spur cylindric, 18 mm. long, surpassing the sepal blades, 3.5 mm. wide at base, incurved; laminae of upper petals glabrous, 9 mm. long, the spur 16 mm. long; lower laminae 10 mm. long, round-ovate, 2-lobed, the lobes acute, bearded above; carpels 3, densely villous; styles long, glabrous.

TYPE: Tibet near Shigatse, Linbun rivulet, July 29, Kitamura 103908 (KYO). I have been unable to see material of this species. The original description said that it differs from *D. speciosum* in the inflorescence not being leafy, and from *D. iliense* in its villous carpels, scarcely erect pedicels, and bracteoles not next to the flower.

210. *Delphinium kuanii* W. T. Wang, Acta Bot. Sinica 10: 84. 1962.

Stem 5 dm. tall, 3 mm. thick at base, longitudinally striate, retrorsely or spreading-hairy, few branched, equally foliose; basal leaves and lower cauline long petioled; blades shaped as in *D. naviculare*, broad-reniform, 5.5 cm. long, 10 cm. wide, 3-parted to ca. 1 cm. above the base, middle part cuneate-obtrapezoid, 3-lobed above, the lobes 1–2-toothed, the teeth deltoid, laxly hirsute on both surfaces, petioles from twice as long as laminae to equal to them, narrowly vaginate, with same indument as the stems; racemes 4–10-flowered, lax, the axes strigulose; lower bracts trifid, others lanceolate, 8–14 mm. long, 2–3 mm. wide, densely strigulose; pedicels 1–3 cm. long, densely retrorse-strigulose, ascending; bracteoles to 15 mm. below the flowers or near them, lance-oblong or lanceolate, 8–10 mm. long, 2–2.5 mm. wide; sepals purplish, elliptic, 12–15 mm. long, densely strigulose without, glabrous to loosely hairy within, spur 11.5–13 mm. long, saccate-cylindric, 4–4.5 mm. thick at base, straight, obtuse; petals black, the upper laminae glabrous, rounded at apex; lower laminae



broadly rectangular, with 2 deltoid lobules at the rounded apex, few toothed, yellow bearded at base, claw appendiculate; filaments pilose; carpels 3, densely strigose; style barely 1 mm. long.

TYPE: Sikang, Wen Chuan, Aug. 27, 1957, K. C. Kuan 4698 (PE), not seen. I have had no material of *Delphinium kuanii*, which the author said was near *D. elliptico-ovatum* but with bracteoles lance-oblong to lanceolate; spur saccate-conic; ovary densely strigulose, and styles shorter.

211. *Delphinium lacei* Munz, sp. nov.

FIG. 17, I.

Perennial from thick fleshy roots; stems slender, usually somewhat branched above, often reddish, slender, retrorse-strigulose or -pubescent, scarcely if at all glandular, 4–8 dm. tall, with a few scattered leaves; basal leaves with blades somewhat reniform in outline, 3–6 cm. broad, 5- or 7-fid to ca.  $\frac{3}{4}$  their length, with a scattering of long hairs on both surfaces, the segments subcuneate, sharply 3-toothed at apex or sometimes 3-lobed, each lobe then sharply toothed, the teeth acute-acuminate, mucronate, lance-ovate; petioles slender, to 1 dm. long, spreading-villous, somewhat dilated at base; upper leaves reduced, the uppermost to ca. 1 cm. long, 3-lobed with broad petioles; inflorescence a few-flowered raceme, with shorter subsidiary branches; bracts mostly lanceolate, 8–15 mm. long, villous; pedicels ascending, 1–3 cm. long, the bracteoles near the middle or above, lanceolate, 5–8 mm. long; flowers bluish, with more or less yellowish hairs throughout; upper sepal ovate, 18 mm. long, 12 mm. wide, obtuse, the spur somewhat decurved, 16–20 mm. long, 2.5–3 mm. wide at base; lateral sepals round-obovate, 15–16 mm. long, 12 mm. wide, rounded-truncate at apex; lower sepals elliptic-obovate, 18 mm. by 10 mm., obtuse; petals black, the upper laminae somewhat oblique, 8 mm. by 3 mm., slightly emarginate at the rounded apex, the spur 15–17 mm. long; lower laminae oblong-ovate, 4.5 mm. by 4 mm., bearded, ciliate, bifid ca. 1.5 mm. into broad lobes, claw broad, 5 mm. long; stamens 6–7 mm. long, glabrous; anthers dark; follicles 3, erect, 12–16 mm. long, 4 mm. wide, pubescent, the styles an additional 3 mm.; seeds black, angled, scarcely winged or squamate, almost 2 mm. long.

Planta perennis, ex radicibus lignosis; caules tenues, supra plerumque ramosi, saepe rubelli, retrorso-pubescentes, vix vel non glandulosi, 4–8 dm. alti, parum foliosi; laminae foliorum basaliū subreniformes, 3–6 cm. latae, 5–7-fidae, sparse villosae, segmentibus subcuneatis, apice acute 3-dentatis vel -lobatis; petioli tenues, ad 1 dm. longi, extenso-villosi, subvaginati; folia superiora parva, 3-lobata, late petiolata; inflorescentia racemosa, cum floribus paucis et ramulis brevibus; bracteae lanceolatae, 8–15 mm. longae, villosae; pedicelli ascendentes, 1–3 cm. longi; bracteolae in medio pedicelli, lanceolatae, 5–8 mm. longae; flores subcaerulei, cum pilis aureis; sepalum superiore ovatum, 18 mm. longum, 12 mm. latum, obtusum; calcar curvatum, 16–20 mm. longum, base 2.5–3 mm. latum; sepala lateralia rotundo-obovata, 18 mm. longa, 12 mm. lata; sepala in-



feriora elliptico-obovata, 18 mm. longa, 10 mm. lata, obtusa; petala atra, laminae superiores 8 mm. longae, parum emarginatae, calcar 15–17 mm. longum; laminae inferiores oblongo-ovatae, 4.5 mm. longae, hirsutae, bifidae, unguis latus, 5 mm. longus; stamina 6–7 mm. longa, glabra; follicula 3, erecta, 12–16 mm. longa, pubescentia; semina atra, angulosa, fere 2 mm. longa.

TYPE: Burma, Ruby Mines district, Bernardmyo, 1750 m., Oct. 25, 1912, *J. H. Lace 6012* (CAL, E 3 sheets, K); seen. I would designate the K sheet as type, those at CAL and E as isotypes.

ANOTHER COLLECTION. Burma: Mt. Victoria Ridge, 2700 m., Oct. 26, 1956, *Kingdon Ward 22749* (BM).

212. *Delphinium leptopogon* Hand.-Mazz. Acta Horti Gothob. 13: 58. 1939. FIG. 17, J.

Perennial, the stem 7–8 dm. tall, branched only above, slender, to 5 mm. thick, glabrous and glaucous below or with some stiff white hairs at base of petioles, evenly but rather remotely leafy; leaf blades roundish in outline, the lower 8–13 cm. wide, green and minutely strigulose on both surfaces, the cauline divided almost to base into 5 divaricate lanceolate, entire to 2–3-toothed segments 5–8 mm. wide, acuminate; petioles not dilated at base, about as long as the blades or the uppermost shorter; inflorescence subcorymbose at the end of each branch, 4–20-flowered, with spreading glandular hairs; bracts leaflike and trifid or entire and lanceolate, 1–2 cm. long; pedicels divaricate to erect, 1–4 cm. long; bracteoles in middle or above, subulate, 3–5 mm. long; sepals violet-blue, densely strigulose; upper sepal ovate, 14 mm. by 8 mm., acute, the spur almost straight, 20–22 mm. long, 4–5 mm. wide at the base, gradually narrowed to a blunt tip; lateral sepals ovate, 17 mm. by 8 mm., acute; lower sepals 15 mm. by 6 mm., subacuminate; petals mostly dark, the upper laminae quite oblique, 9 mm. long, subacuminate, somewhat emarginate, the spur 19 mm. long; lower laminae sometimes yellowish, strongly oblique, oblong, with scattered white hairs, entire to shallowly 2-lobed, ca. 9 mm. by 3 mm., the claw 6 mm. long; stamens 6–7 mm. long, the base only slightly widened, glabrous; anthers dark, linear-oblong, 1.5 mm. long; follicles 3, glabrous to sericeous; seeds winged on angles.

TYPE: Shansi, distr. Chiao-ch'eng, Pa-shui-ko, 1900 m., *Harry Smith 7109*, holotype (UPS), not seen; isotype (A), seen.

I would place in this species also *Rock 13136* (GH, NY) from southwestern Kansu.

213. *Delphinium longiciliatum* W. T. Wang, Acta Bot. Sinica 10: 84. 1962.

Stem ca. 8 dm. tall, 3 mm. thick at base, loosely spreading- or retrorse-hirsute, simple, equably leafy; middle cauline leaves longish petioled; leaf blade as in *D. naviculare*, broadly pentagonal, 6.5 cm. long, 11 cm. wide,



3-parted, the middle part rhombic, upper trilobed, the middle lobes triangular-ovate, with few coarse teeth, the lateral lobes smaller, obliquely ovate, coarsely 1-2-toothed, loosely strigulose on both surfaces; petioles ca. as long as blades, not vaginate at base, with same pubescence as on the stems; raceme ca. 16 cm. long, 10-flowered, rather lax; pedicels 1-3 cm. long, ascending, glabrous; lower bracts lanceolate, ca. 15 mm. long, 3 mm. wide, others 7-12 mm. long, 1-1.2 mm. wide, acute, long-ciliate; bracteoles to 3-5 mm. below the flower, linear-lanceolate to oblanceolate, 7 mm. long, acute, long-ciliate; sepals purple, the upper ovate, others obovate, 13-14 mm. long, glabrous or slightly ciliate at apex; spur 17-18 mm. long, straight; petals black, the upper laminae emarginate, loosely pilose; lower laminae broadly ovate, with 2 obtuse, triangular lobes, yellow bearded at base, long-ciliate at ends, claw shorter than lamina, appendiculate at base; stamens glabrous; carpels 3, subglabrous.

TYPE: Sinkang, at Ili, Aug. 8, 1957, *K. C. Kuan* 3209 (PE?), not seen.

The author of the species suggested that it is near *D. tianshanicum* Wang, but with the sepals, pedicels, and ovaries glabrous.

214. *Delphinium maackianum* Regel, Mém. Acad. Pétersb. VII. 4 (4): 9. 1861. FIG. 17, K.

*Delphinium maackianum* var. *ussuriense* Regel, loc. cit. "bracts and carpels glabrous," apparently based on same material as the species. Var. *lasiocarpum* Regel, based on *Wilford* from the "Coast of Manchuria" (GH, K, P) seen.

*Delphinium maackianum* var. *cuneatum* Regel ex Huth, Bot. Jahrb. 20: 400. 1895. Apparently the type collection is "Ad flum. Amur, montes Burgae" (Bureja in Huth), *Radde* (K, P) seen.

*Delphinium maackianum* Regel var. *palmatum* (Lévl.) Nakai, Jour. Coll. Sci. Imp. Univ. Tokyo 31: 433. 1911. *D. elatum* var. *palmatum* Lévl., Bull. Acad. Géogr. Bot. 11: 300. 1902. *D. lycoctonifolium* Lévl., Repert. Sp. Nov. 7: 100. 1909. All based on *Faurie* 26, from mountains Kan-Ouen-To, Korea (E), isotype (UC); both seen.

Perennial from a woody rhizome, the stem 5-8 dm. tall, glabrous or pubescent below, pubescent above with short spreading hairs, stem simple or branched in the inflorescence, ca. 5-6 mm. thick below, leafy, the petioles glabrous to hairy, dilated at base, the lower to 2 dm. long, the upper much shorter; leaf blades mostly broadly rounded in outline, the lower to 2 dm. wide, not quite as long, subglabrous to strigose on both surfaces, 5- or 7-fid to well above the base into broad cuneate-based ovate segments commonly 2-5 cm. broad and rather shallowly incised or toothed into ovate or lance-ovate lobes or teeth; upper leaves reduced, often only 3-fid; inflorescence loosely paniculate, pubescent, the lower bracts foliaceous, divided, the others ovate or elliptic-ovate, membranous, bluish, glabrous, 5-20 mm. long; pedicels pubescent, ascending, 1-5 cm. long; bracteoles lance-ovate, shorter, inserted well below the flower; sepals dull blue, subglabrous or slightly pubescent, the upper sepal 14-16 mm. long,



8–10 mm. wide, ovate, subacute, the spur straight or curved or even uncinat, 15–20 mm. long, 3.5–4.5 mm. wide at base, narrowed to rather a sharp tip; lateral sepals 12–16 mm. long, 8–10 mm. wide, obtuse; lower sepals 12–14 mm. long, 6–7 mm. wide, subacute; petals dark, the upper laminae slightly oblique, glabrous, subacute, entire or nearly so, 10–11 mm. long, the spur 15–16 mm. long; lower laminae ovate, oblique, 5 mm. long, 3 mm. wide, cleft one half their length, ciliate and sparsely bearded, with a patch of yellow hairs near the base, claw 5.5 mm. long; stamens 6–7 mm. long, glabrous, slightly dilated below; anthers dark, 1.5 mm. long; follicles 2–3, glabrous, divergent, 18–20 mm. long, the styles an additional 3 mm.

TYPE: Manchuria, on the Sungacha River (tributary of the Ussuri River), *Maack*, isotypes (GH, K, P), seen.

DISTRIBUTION. The species occurs in Manchuria and Korea.

EXAMPLES: Manchuria: *Komarov* 671 (BM, K); *Maximowicz* in 1860 (BM, GH, K, NY, P); *Litvinov* 2026 (NY), 3013 (NY); *F. H. Chen* 341 (BM, GH, NY, P); *Bohnhof* 163 (NY, P). Korea: *Chung In-Cho's* collector 9440 (MICH), 10347 (MICH), 9391 (MICH); *Ohwi* 2808 (BH); *Bushnell* 470 (BM).

215. *Delphinium mariae* Busch in Fl. Cauc. Crit. III. 3: 69. 1903.

FIG. 17, L.

Perennial, the stem several dm. tall, strigulose below, otherwise glabrous, angular-sulcate, leafy; cauline leaves slightly strigose on both surfaces, paler beneath, ca. 1 dm. broad, 5-parted almost to the base, the segments narrowly cuneate-obovate, deeply lacinate into lance-linear lobes 1.5–2.5 mm. wide, 5–25 mm. long; petioles scarcely vaginate at base; raceme lax, many flowered, glabrous, to 3.5 dm. long, branched below; bracts linear-lanceolate, 1–2 cm. long; pedicels suberect, 3–4 cm. long; bracteoles subtending the flowers, linear-lanceolate, ca. 10 mm. long, 2 mm. wide; sepals blue-violet, glabrous, slightly ciliate, the upper sepal ovate, 18–20 mm. long, 8 mm. wide, obtuse, the spur spreading decurved, 16–17 mm. long, 3.5 mm. wide at base; lateral sepals elliptic-obovate, 20 mm. by 12 mm., rounded at apex; lower sepals 18 mm. by 7 mm., rounded-truncate at tip; petals black, the upper laminae slightly oblique, 12 mm. long, slightly bidentate at the glabrous apex, the spur 13 mm. long; lower laminae 5 mm. by 4 mm., oblong-obovate, bearded near base, long-ciliate on the round-oblong divergent lobes, the claw appendiculate, 6.5 mm. long; stamens 6–7 mm. long; anthers dark; carpels 3, glabrous.

TYPE: In meadows at 1850 m., between Tsulkan and Gapschina, Dagestan, July 19, 1898, *Alexeenko* (LE), seen.

I have seen no other examples of this species.

216. *Delphinium megalanthum* Nevski in Komarov, Fl. U.S.S.R. 7: 129, 722. 1937.

FIG. 17, M.

*Delphinium flexuosum* var. *paulovii* Akinf. Trav. Soc. Nat. a l'Univ. Imp. Kharkow XXVII: 167. 1894. *Delphinium speciosum* var. *paulovii* N. Busch



in Fl. Cauc. Crit. III. 3: 64. 1903. Cited as synonyms in the original description of *D. megalanthum*.

Stem 3.5–7.5 dm. tall, ribbed, lightly pilose below, glabrous above, foliose; petioles scarcely dilated at base, ciliate along margin; leaves lightly pilose or glabrous above, more pallid and pilose on veins beneath, ciliate on margins, 5–10 cm. broad, 5-fid, the segments cuneate-obovate, 3-incised to the middle, then coarsely few-lobulate into lanceolate parts 2–5 mm. wide, 2–10 mm. long, acute; racemes erect, branched at base, to 3 dm. long, lax; lowest bracts foliose, others linear-lanceolate, 6–20 mm. long, 1–2.5 mm. wide, glabrous; pedicels strict or slightly spreading, glabrous or almost so, 3–7 cm. long; bracteoles ovate-lanceolate or ovate, 7–9 mm. long, 3–4 mm. wide, obtusely acuminate, glabrous, rarely slightly ciliate, usually violet in color, near or to 0.5 cm. below the flower; sepals blue, the upper 22 mm. long, 10 mm. wide, obtuse, glabrous, the spur 20 mm. long, 4 mm. wide at base, slightly incurved toward the acute tip; lateral sepals 23 mm. by 12–14 mm.; lower ca. 22 mm. long; petals black, the upper laminae slightly oblique, glabrous, emarginate, 13 mm. long, the spur 16 mm. long; lower laminae perpendicular to the claw, oblong, 9 mm. by 4 mm., bearded at base and on the 2 oblong lobes, claw 7 mm. long; stamens 7–8 mm. long; anthers dark, 1.5 mm. long; carpels 3, glabrous.

TYPE: "Caucasus septentrionalis, prope glaciem Bezengi, July 25, 1892, lg. *Lipsky*" (LE); seen. It is near to *D. speciosum* but seems different in its glabrous flowers.

217. *Delphinium mirabile* Sergievsk. Animadvers. Syst. Herb. Univ. Tomsk 1930. 3–4: 5. 1930. FIG. 17, N.

*Delphinium laxiflorum* var.  $\beta$  *alpinum* Bunge, Fl. Altaica Suppl. 33 [orig. 555]. 1836. Placed here in synonymy by Nevski in Komarov, Fl. U.S.S.R. 7: 131. 1937. I have seen a collection from "Altai" Herbar. Bunge, Fl. orient. altaica, 1839 (MO) which may represent this taxon.

Stem slender, 2.5–4 dm. tall, leafy below, sparsely pilose above, simple or nearly so, angled below; petioles to 1 dm. long, slender, somewhat dilated at base, pilose; leaf blades round-reniform in outline, 3–9 cm. wide, more or less strigulose above, paler and short-hairy beneath, 3-, 5-, or 7-parted almost to base into cuneate-rhombic segments 5–10 mm. wide below, 10–15 mm. wide above, these trilobed to about the middle then sometimes incised into sharp divergent teeth; inflorescence a 5–10-flowered raceme or panicle 7–10 cm. long, strigose and with some short more spreading hairs; bracts entire, mostly linear, 5–15 mm. long, sometimes 2–3-parted, pubescent; pedicels pilose, 1–2 cm. long; bracteoles linear, 3–4 mm. long, placed just below the flower; sepals sordid blue-violet, white pilose on both outer and inner surfaces; upper sepal ca. 18 mm. by 14 mm., apiculate, the spur spreading decurved, 16–17 mm. long, 3.5 mm. wide at base, subcylindric, the apex obtuse; lateral sepals broadly elliptic-obovate, 18 mm. by 10 mm., broadly obtuse; lower sepals 20 mm. by 8 mm.,



subacute, asymmetrically lance-obovate; petals blackish, the upper laminae almost straight, 10 mm. long, 3 mm. wide, rounded and slightly erose at the summit, spur 17–18 mm. long; lower laminae oblique, oblong, 5 mm. by 3.5 mm., bifid from near the middle into oblong lobes, scattered-hirsute, ciliate, the claw 6.5 mm. long; stamens 6–7 mm. long, glabrous; anthers dark, oblong, 1.3 mm. long; follicles 3, pubescent.

TYPE: "In montibus Altaicis austro-orientalibus ad fl. Taldura," July 18, 1903, *P. Krylov* (TK); not seen.

Drawings and description made from "Altai," Herbar. Bunge (MO).

218. *Delphinium naviculare* W. T. Wang, Acta Bot. Sinica 10: 82. 1962.

Stem ca. 7 dm. tall, 3.5 mm. thick below, spreading or retrorsely hirsute, glabrescent below the inflorescence, simple, subequally foliose; basal and lower cauline leaves long petioled; leaf blades broadly reniform-pentagonal, 3–4.5 cm. long, 5–5.5 cm. wide, cordate, 3-parted, the middle part rhombic, acute, 3-lobed below the middle, the lateral parts oblique, unequally 2-lobed to the middle, all 5 parts then few toothed, loosely hirsute on both sides; petioles vaginate at base; racemes ca. 3 dm. long, many flowered, rather dense; pedicels 1–3 cm. long, erect-spreading, glabrous; lower bracts 14–17 mm. long, trifid, the lobes lanceolate, acute, the other bracts ovate, 7–10 mm. long, 3.8 mm. wide, abruptly acute; bracteoles near the flowers, ovate to elliptic, 4–5 mm. long, boat-shaped, acuminate, ciliate; sepals purplish, glabrous or ciliate at apex, the upper broadly elliptic, lateral round-obovate, lower elliptic, 9–12 mm. long; spur 12–13.5 mm. long, glabrous, almost straight, conic-subulate; petals black, the upper laminae glabrous, obliquely truncate, entire; lower laminae broad-oblong, with 2 deltoid-ovate lobes to the middle, yellow bearded at base, long-ciliate, the claw exappendiculate; stamens glabrous; carpels 3, glabrous.

TYPE: Sikang, at Chigo-Su, Aug. 11, 1957, *K. C. Kuan* 3229 (PE), not seen.

I have not seen this species which Wang says is near *D. ruprechtii* but with smaller flowers and bracteoles. Wang's *Delphinium naviculare* var. *lasiocarpum* (Acta Bot. Sinica 10: 83. 1962), described as having pedicels and sepals with spreading yellow-glandular hairs, is not known to me and I am uncertain as to its disposition.

219. *Delphinium nevskii* Zakirov, Not. Syst. Herb. Inst. Bot. Acad. Sci. U.S.S.R. 12: 92. 1950. FIG. 18, A.

Perennial from a woody root, 4–6 dm. tall, the stem white-hairy especially in the inflorescence, 5–7 mm. thick, few branched above, scattered leafy; lower petioles 12–25 cm. long, sulcate, retrorse-pubescent, somewhat vaginate at base, the upper much shortened; lower blades roundish in outline, 6–10 cm. wide, pilose on both surfaces, 3-parted to below the middle, the broad parts 2–3-lobed in distal portion, then with coarse more



or less oblong-ovate, mucronulate teeth 4–8 mm. long and almost as broad; central raceme rather dense, hairy, to 2 dm. long, many flowered; bracts lanceolate, white-hairy, 6–8 mm. long, 1–2 mm. wide; pedicels spreading-ascending, 1–2 cm. long, soft-hairy; bracteoles above the middle of the pedicel, subulate-lanceolate, 3–5 mm. long; sepals white with yellow nerves, pilose on both surfaces; upper sepal 15 mm. by 7 mm., acutish, the straight spur 12–15 mm. long, 2.5 mm. wide at base; lateral sepals subelliptic, 13 mm. by 6 mm., obtuse; lower sepals subelliptic, 12 mm. by 6 mm., more pointed; petals blackish, the upper laminae almost straight, 8 mm. long, bidentate, stiff-hairy at apex, the spur ca. 12 mm. long; lower laminae oblong-ovate, oblique, 5 mm. long, bifid about halfway, hairy and white-ciliate, the claw 5 mm. long; stamens 5–6 mm. long, glabrous; anthers pale, 1 mm. long; follicles 3, soft-hairy, 10 mm. long, 3 mm. wide, the styles an additional 3 mm.

TYPE: Uzbekisten, system of River Zeravschan, Mt. Chazrat-Sulton, limestone, 3300–3800 m., Aug. 27, 1942, *K. Zakirov* (LE); seen.

The species is said to be near *D. oreophilum*, differing in smaller white flowers and equal pubescence on both surfaces of the leaves.

220. *Delphinium ochotense* Nevski in Komarov, Fl. U.S.S.R. 7: 146, 724. 1937. FIG. 18, B.

*Delphinium elatum* var. *subglabrum* Regel & Tiling, Nouv. Mém. Soc. Nat. Mosc. 11: 39. 1859, not var. *subglabrum* Ledeb. 1841. Based on same type as *D. ochotense*.

Stem 2–5 dm. tall, with soft short pubescence, slightly glandular above, densely leafy; leaves round-cordate to -reniform, to 15 cm. broad, slightly pubescent, palmatisect, the segments commonly biternately divided into terminal obtuse or subobtuse, broadly elliptic to lanceolate teeth 5–20 mm. long, 4–10 mm. wide; raceme many flowered, the axis and pedicels densely soft-pubescent; bracts linear, 8–20 mm. long, the lowest lanceolate or trifid, to 4 cm. long; pedicels erect, 1–3 cm. long; bracteoles subtending the flower, linear, 4–6 mm. long; sepals blue, ovate to ovate-lanceolate, obtuse, 1.3–2.2 cm. long, 5–9 mm. wide, with some spreading hairs; spur spreading, almost straight or somewhat incurved near the apex, 1.2–1.7 cm. long; petals black, the upper laminae somewhat oblique, 10 mm. long, glabrous, entire, the spur 16–17 mm. long; lower laminae bearded at base, ovate, 4 mm. long, with triangular lobes 1.5 mm. long, claw 6 mm. long.

TYPE: Extreme eastern Siberia, near Ajan, legit *Tiling* (LE); seen.

*Delphinium ochotense* differs from *D. elatum* in having some glandular hairs in the inflorescence and lower petals with broader laminae.

221. *Delphinium oreophilum* Huth, Bot. Jahrb. 20: 412. 1895.

FIG. 18, C.

Stem thick, erect, subglabrous, 5–6 dm. tall; leaves well distributed on the stem; petioles 2–4 dm. long, dilated at the base; the blades roundish,



8–12 cm. in diameter, divided almost to base into 3 or 5 parts, subglabrous above, quite pubescent beneath especially on the veins, the parts broad, then lobed about halfway to base into broad portions which are in turn divided at tips into lanceolate lobules or teeth 5–15 mm. long; inflorescence somewhat branched at base, the racemes very dense, the central one rather many flowered; bracts, except the lowest, entire, hirsute, 5 mm. long; pedicels hirsute, 1.5–6 cm. long; bracteoles linear, remote from flowers, ca. 2 mm. long; sepals dilute blue, white-hirsute without and within, the upper 12–13 mm. long, 7 mm. wide, the spur straightish or somewhat curved, 12–13 mm. long, 3.5 mm. wide at base, blunt; lateral sepals elliptic-oblong, 16 mm. by 7 mm., rounded at apex; lower sepals 13 mm. by 8 mm.; petals black-violet, the upper laminae short-bristly on face, oblique, 11 mm. long, bidentate at the glabrous tip, spur 11 mm. long; lower laminae yellow bearded on face, white-ciliate at tip, oblong-ovate, oblique, 5 mm. long, bifid to below the middle, claw 6 mm. long; stamens 7–8 mm. long, glabrous; anthers dark, oblong, 1.5 mm. long; carpels 3, densely hirsute; seeds squamate, the scales coalesced in transverse rows.

LECTOTYPE: Bucharra oriental; inter Talbas and Sagridascht, 3000–3300 m., *A. Regel*, 1882 (LE); seen.

In 1940 Afanasiev published as a new species *Delphinium rotundifolium* (Not. Syst. Herb. Inst. Bot. Acad. Sci. USSR. 8: 108) based on *Afanasiev* 227 from Turkestan, which he said was near *D. oreophilum*. So far as I can judge from the description this is the case. I have seen no material and therefore am tentatively reducing it to synonymy under *D. oreophilum*.

222. *Delphinium oxycentrum* W. T. Wang, Acta Bot. Sinica 10: 73. 1962.

Stems 4.5–7 dm. tall, 3.5–4.5 mm. in diameter, glabrous, simple or with one branch above, the branch racemiferous; basal leaves ca. 2, long petioled; leaf blades broadly round-reniform, 4–6 cm. long, 7–11 cm. wide, open-cordate at base, 3-parted to beyond the middle, the parts imbricate, the middle part 3-lobed into ovate incised-lobulate or coarsely toothed lobes, the lateral parts unequally trifid, then lobed and toothed much like the middle one, loosely strigulose on both surfaces or subglabrous above; petioles 2–2.5 dm. long, loosely hirtellous, inconspicuously vaginate at base; cauline leaves 1–2, like the basal but smaller, short petioled or subsessile; racemes terminal, the main one 9–12-flowered, rather dense; lower bracts 3-parted, others spatulate- to linear-oblong, 9–12 mm. long, subglabrous or loosely hairy; pedicels 2–6.5 cm. long, stout, glabrous; bracteoles apical, lance-linear, glabrous or loosely hairy; flowers erect or nearly so; sepals subglabrous or loosely ciliate, the upper 21–25 mm. long, 17–22 mm. wide, the subulate spur 26–42 mm. long, sharply acute; lateral sepals rounded or round-ovate, 14–17 mm. long, 11–14 mm. wide; lower 15–18 mm. long, 6–10 mm. wide; petals blackish brown, glabrous, the



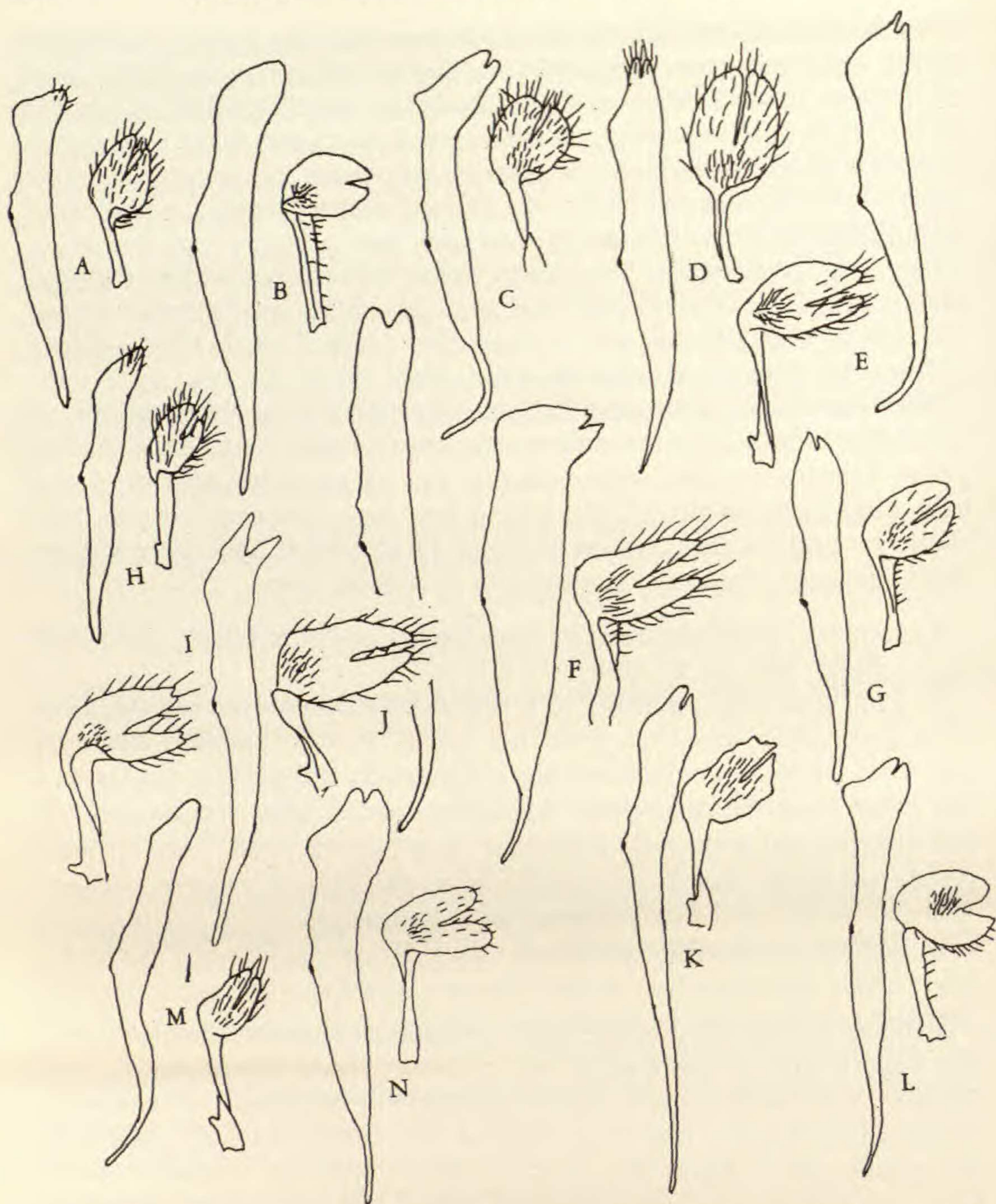


FIGURE 18. *Delphinium*, GROUP IX. Petals, the upper spurred, the lower clawed. A. *D. nevskyi*; upper lamina 8 mm. long, spur 11 mm.; lower lamina 4.5 mm. long, claw 5 mm.; drawn from *Zakirov* in 1942, TYPE (LE). B. *D. ochotense*; upper lamina 10 mm. long, spur 17 mm.; lower lamina 4 mm. long, claw 6 mm.; drawn from *Tiling* near Ajan, TYPE (LE). C. *D. oreophilum*; upper lamina 10 mm. long, spur 11 mm.; lower lamina 5 mm. long, claw 6 mm.; drawn from *Regel* in 1882, TYPE (LE). D. *D. poltaratzkii*; upper lamina 12 mm. long, spur 13 mm.; lower lamina 7 mm. long, claw 6 mm.; drawn from *Ludlow* 762 (BM). E. *D. pyramidale*; upper lamina 9 mm. long, spur 14 mm.; lower lamina 6.5 mm. long, claw 7 mm.; drawn from *Stewart* 21882 (NY). F. *D. pyramidale*; upper lamina 12 mm. long, spur 15 mm.; lower lamina 7.5 mm. long, claw 6 mm.; drawn from *Ludlow & Sherriff* 1534 (E). G. *D. pyramidatum*; upper lamina 9 mm. long, spur 12.5 mm.; lower lamina 5 mm. long, claw 5 mm.; drawn from *Alboff* 194 (NY). H. *D. retropilosum*; upper lamina 8 mm. long, spur 9 mm.;



upper laminae 2-lobulate; lower laminae ovate, bilobed one-third their length, the lobes triangular, claw 3 to 5 times as long; stamens 10–12 mm. long; carpels 3, glabrous.

TYPE: Szechwan, Kung-ka-ling, 1000 m., Sept. 1, 1937, *Yü 13129* (PE), not seen, photo. (E), seen.

223. *Delphinium poltaratzkii* Rupr. in Osten-Sacken & Rupr. Sert. Tian-shan. 37. 1869. (Mém. Acad. Pétersb. VII. 14: 4. 1869).

FIG. 18, D.

Perennial, the stem 2.5–5.5 dm. tall, robust, spreading-villous, not glandular, more or less leafy; lower leaves with blades 5–7 cm. long, 6–12 cm. wide, subglabrous above, more or less villous beneath especially on veins, 3- or 5-fid halfway to base or deeper, into broad-rhombic segments shallowly lobed or toothed, the teeth ovate, 3–6 mm. long and wide, mostly acute, mucronate; lower petioles 1–2 dm. long, scarcely dilated at base; upper leaves gradually reduced; inflorescence branched, the terminal raceme 4–10-flowered, the lateral 1–4-flowered, or the inflorescence simple, subcapitate; bracts colored, 2–3 cm. long, the lower trifid, the upper entire, 1–2 cm. long; pedicels 1.5–4 cm. long; bracteoles colored, appressed to sepals, linear-oblong, to 10 mm. long; sepals purplish mauve to saturated blue, the upper sepal ovate, 15–20 mm. long, 10 mm. wide, obtuse, the spur 8–12 mm. long, 5 mm. wide at base; lateral sepals broadly obovate, 14–20 mm. long, 11 mm. wide; lower sepals 12–16 mm. by 9 mm.; petals almost black, the upper laminae almost straight, 12 mm. long, bidentate, the spur 12 mm. long; lower laminae broadly elliptic, 7 mm. long, bearded, bifid two-thirds its length into broad lobes, the claw 6 mm. long; stamens 6–7 mm. long, glabrous; anthers dark, 1.2 mm. long; carpels 3, somewhat pubescent.

TYPE: Turkestan, Tian-shan Mts., below Schamsi, *Poltaratzki* (LE); seen.

The species apparently grows in open grassland at about 2500 m. It is represented by *Ludlow 762* (BM, E) from Koksu-Kensu Junction, Tian Shan.

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lower lamina 4 mm. long, claw 6 mm.; drawn from *Tarchevskaya & Vandysheva* (NY). I. *D. ruprechtii*; upper lamina 12 mm. long, spur 14 mm.; lower lamina 7 mm. long, claw 6 mm.; drawn from *Alexeenko* in 1898, TYPE (LE). J. *D. speciosum*; upper lamina 14 mm. long, spur 20 mm.; lower lamina 8 mm. long, claw 6 mm.; drawn from *Kamennik* in 1933 (NY). K. *D. stapeliosum*; upper lamina 10 mm. long, spur 20 mm.; lower lamina 6 mm. long, claw 6 mm.; drawn from *Clarke 44861* (US). L. *D. tianshanicum*; upper lamina 9 mm. long, spur 14 mm.; lower lamina 5 mm. long, claw 6 mm.; drawn from *Li & Chu 7003* (E). M. *D. villosum*; upper lamina 9 mm. long, spur 12 mm.; lower lamina 3.5 mm. long, claw 6 mm.; drawn from *Gillett* in 1939 (BH). N. *D. winklerianum*; upper lamina 10 mm. long, spur 14 mm.; lower lamina 5 mm. long, claw 6 mm. drawn from *Winkler 7230*, TYPE (LE).



224. *Delphinium pyramidale* Royle, Illustr. Bot. Himal. 56. 1834.

FIG. 18, E, F.

*Delphinium speciosum* Bieb. var. *pyramidale* (Royle) Mukerjee, Bull. Bot. Surv. India 2: 293. 1961.

*Delphinium ranunculifolium* Wall. Cat. n. 4716. 1830, *nomen*; Hook. f. & Thoms. Fl. Ind. 51. 1855, based on Wallich 4716, Bhudrinak RB, seen (κ).

*Delphinium elatum* L. var. *ranunculifolium* (Wall.) Hook. f. & Thoms. in Hook. f., Fl. Brit. Ind. 1: 26. 1872.

*Delphinium speciosum* Bieb. subsp. *ranunculifolium* (Wall.) Brühl & King, Ann. Bot. Gard. Calc. 5: 105. 1896.

*Delphinium speciosum* var. *ranunculifolium* (Wall.) Huth, Bot. Jahrb. 20: 416. 1895.

*Delphinium speciosum* var. *bruehlianum* Huth, Bot. Jahrb. 20: 416. 1895, new name for *D. elatum* var. *ranunculifolium* in Hook. f. Fl. Brit. Ind. 1: 26. 1872.

? *Delphinium speciosum* subsp. *ranunculifolium* vars. *brachycentra*, *eriantha*, *katatricha*, *lasiantha*, *marriensis*, *oinophylla*, *pulverulenta* and *thyrsantha* Brühl in Brühl and King, Ann. Bot. Gard. Calc. 5: 106–7. 1896. These are uncertain taxa to me. Illustrative herbarium material has not been available to me on loan.

*Delphinium pulchellum* Chowdhury ex Mukerjee, Bull. Bot. Surv. India 2: 293. 1961; *nomen*. I have seen material from Edinburgh annotated "pulchellum" by Chowdhury.

? *D. hoffmeisteri* Klotzsch, Bot. Ergeb. Waldem. Reise 132. 1862. It has been referred to *D. elatum*, but since it came from the Himalaya, it seems south of the range of that species. No material seen.

Perennial from a rhizome, stem 6–12 dm. tall, 4–8 mm. thick, glabrous to spreading-villous, usually leafy throughout, branched only in the inflorescence; lower petioles to 4 dm. long, scarcely dilated at base, glabrous to villous, the upper short; blades rounded-pentagonal in outline, 6–15 cm. wide, glabrous above and beneath, to subtomentose or villous, especially beneath and along the veins, 3- or 5-partite  $\frac{2}{3}$  to  $\frac{4}{5}$  the way to the base into broad cuneate segments, these cleft and incised-serrate, the ultimate lobes ovate to lanceolate, mostly 2–7 mm. wide, mucronate; upper leaves passing into foliose parted bracts, these lanceolate to lance-ovate, to ca. 15 mm. long; inflorescence racemose or a group of racemes, many flowered, variously pubescent; pedicels ascending, to ca. 5 cm. long; bracteoles lanceolate, 3–8 mm. long, subtending the blue or purple flowers; sepals pubescent without and within; upper sepal 15 mm. by 7 mm., ovate, obtuse, spur straight or decurved, 12–15 mm. long, 3.5 mm. wide at base, gradually narrowed to a blunt apex; lateral sepals rhombic-ovate, 17 mm. by 10 mm., subtruncate at apex; lower sepals 16 mm. by 8 mm., obtuse, narrow-obovate; petals bluish black, the upper laminae slightly oblique, 10 mm. long, bidentate at apex, the spur 14 mm. long; lower laminae elliptic-oblong, 6.5 mm. by 3.5 mm., cleft to the middle into lance-oblong lobes long-ciliate, hairy outside and with patch of long hairs at inner base of lamina, claw 7 mm. long; stamens 7–8 mm. long, with strongly dilated glabrous filaments; anthers dark, 1 mm. long; follicles mostly 3, glabrous



or pubescent, more or less divergent, 12–15 mm. long, 3–4 mm. wide, the styles an additional 3 mm. long; seeds blackish, obpyramidal, 1.5 mm. long, densely clothed with laminate scales.

TYPE: Peer Punjal (Pir Panjal), *Royle*. Through the very great kindness of Mr. E. F. Greenwood, Keeper of Botany, City of Liverpool Museums, I have had photographs of the type of *Delphinium pyramidale*. This name has to replace the name *D. ranunculifolium* which was for many years a *nomen nudum*.

RANGE. Apparently from West Pakistan to Nepal at elevations of about 2000 to 3500 m.

ILLUSTRATION. BRÜHL & KING, *Ann. Bot. Gard. Calc.* 5: *pl.* 127. 1896; COVENTRY, *Wild Fl. Kashmir* 2: *pl.* 6. 1927.

EXAMPLES SEEN. Swat: *R. R. Stewart* 29167 (MICH). Kumaon: *Strachey & Winterbottom* 2 (GH, K). Kashmir: *Duthie* Aug. 25, 1892 (BM, E); *C. B. Clarke* 29506 (BM, K); *R. R. & I. D. Stewart* 18357 (GH, NY); *Stewart* 18316 (UC, US), 8079 (NY), 5268 (PHIL), 28781 (E); *Duthie* 19114 (K); *Koelz* 9313 (NA, NY); *Jacquemont* 908 (P). Nepal: *Sharma* E98 (BM); *Dhwoj* 234 (E); *F. M. Bailey* in 1936 (E). W. Tibet: *Falconer* 62 (GH, K, P); *Polunin, Sykes & Williams* 5120 (BM); *Polunin* 2629 (BM).

225. *Delphinium pyramidatum* Alboff, *Descr. Nouv. Esp. Pl.* (1891) II. (*Trav. Soc. Hort. Odessa* 1891); *Busch in Fl. Cauc. Crit.* III. 3: 71. 1902. FIG. 18, G.

*Delphinium elatum* L. var. *pyramidatum* (Alboff) Huth, *Bot. Jahrb.* 20: 399. 1895.

*Delphinium flexuosum* var. *glandulosum* O. Kapeller ex Grossh. *Fl. Cauc.* 2: 100. 1930, according to Nevski in *Fl. U.S.S.R.* 7: 142. 1937.

Stem 1–1.5 m. tall, robust, leafy; leaves 5- or 7-parted, the parts deeply incised into narrow-lanceolate acuminate lobes; inflorescence pyramidate-paniculate to ca. 4 dm. long, glandular-pubescent and strigulose, much branched and with very numerous crowded flowers; bracts narrow-linear, to 2 cm. or more long; pedicels 3–5 cm. long, ascending, pubescent; bracteoles linear, 10–12 mm. long, placed just above the middle of the pedicels; calyx pale blue, more or less puberulous; upper sepal ovate, obtuse, 12 mm. long, 8 mm. wide, the spur decurved, 10 mm. long, 3 mm. wide at base; lateral sepals asymmetric, oblong, 17 mm. by 7 mm., rounded at the broad apex; lower sepals lance-ovate, 14 mm. by 4 mm., pointed; petals blackish brown, the upper laminae erect, glabrous, bidentate at apex, 9 mm. long, the spur 12.5 mm. long; lower laminae oblique, 5 mm. long, cleft to middle, more or less bearded, the claw pubescent, 6 mm. long; stamens 6.5 mm. long, glabrous; anthers dark, oblong, 1 mm. long; follicles 3, glabrous; seeds winged at angles.

TYPE: West subalpine Transcaucasia, Abkhasia, 1300–1400 m., Aug., 1893, *Alboff* 195, isotype (P); seen.

ADDITIONAL COLLECTIONS. *Alboff* 194 (NY), 196 (P), 182 (K).



226. *Delphinium retropilosum* (Huth) Sambuk, Soc. Bot. Russ. 14: 428. 1929. FIG. 18, H.

*Delphinium duhmbergii* Huth var. *retropilosum* Huth, Bot. Jahrb. 20: 402. 1895.

*Delphinium pterospermum* Turcz., *nomen*, according to Nevski in Fl. U.S.S.R. 7: 152. 1937.

Stem 6–8 dm. tall, 6 mm. thick, striate, densely clothed on lower half with white retrorse-spreading hairs 2–3 mm. long, subglabrous above, few branched in inflorescence, rather closely leafy; lower leaves gone by anthesis, main cauline petioles hairy, 5–8 cm. long, dilated at base; blades roundish-elliptic in outline, almost straight across the base, 4–5 cm. long, 6–8 cm. wide, green and glabrous above, conspicuously veined and paler and hairy beneath, palmately 5-fid to 1 or 1.5 cm. above the base into cuneate obovate segments laciniate into 3 main lobes, these toothed or incised into lanceolate lobules 2–3 mm. wide and up to 10 mm. or more long; inflorescence a long, many flowered raceme with short branches below, subglabrous; lower bracts more or less foliose, palmately divided, 15–20 mm. long, with some long bristly hairs; upper bracts lacking; pedicels erect, 1–2 cm. long, angled; bracteoles oblanceolate, 5–8 mm. long; strongly ciliate, placed near the base of the flower; sepals blue, mostly glabrous except for a few marginal hairs; upper sepal ovate, 10 mm. long, 5–6 mm. wide, the spur straight, 1 cm. long, 2.5 mm. wide at base; lateral sepals more or less elliptic, 8 mm. long, 4 mm. wide, rounded at apex, with a few marginal hairs; lower sepals 9 mm. by 5 mm., obtuse; petals dark, the upper laminae slightly oblique, entire, 8 mm. long, with a few bristly hairs, the spur 9 mm. long; lower laminae oblong, 4 mm. by 2 mm., unequally lobed, with long yellow hairs on the surface and long white cilia, claw 6 mm. long; stamens 5 mm. long, glabrous, moderately dilated; anthers dark, 1 mm. long; follicles 3, somewhat pubescent.

TYPE: Indicated only as coming from Siberia.

ILLUSTRATION. Fl. U.S.S.R. 7: *pl.* 10. 1937, drawing of leaf.

I would place two herbarium specimens that I have seen (both from NY, since I was unable to borrow any from LE) in this species: North Altai, *Tarchevskaya & Vandyшева*, July 10, 1932, and Tomsk, without collector, in 1913.

227. *Delphinium ruprechtii* Nevski in Komarov, Fl. U.S.S.R. 7: 138, 723. 1937. FIG. 18, I.

*Delphinium flexuosum* var. *bracteolatum* N. Busch in Fl. Cauc. Crit. III. 3: 67. 1903, *pro parte*, according to Nevski.

Stem to 1 m. tall, ribbed, lightly pilose or almost glabrous, ridged, leafy; petioles not dilated at base, pilose, to ca. 1 dm. long; leaves like those of *D. flexuosum*, scarcely pubescent above, to 12 cm. wide, pilose on nerves beneath, palmatifid almost to base, the middle segment oblong-rhombic, divided into 3 lobes, each with 3 to 5 lanceolate teeth, lateral segments



like the middle one, the ultimate teeth 5–15 mm. long, 3–6 mm. wide; raceme dense, usually branched, the axis glabrous, many flowered, to 3 dm. long; bracts lanceolate, more or less ciliate on margin, 10–15 mm. long, 2–4 mm. wide, somewhat bluish; pedicels glabrous, divergent, 1–4 cm. long; bracteoles elliptic or elliptic-ovate, 5.5–8 mm. long, 4–4.7 mm. wide, subobtuse, violet tinged, glabrous; sepals glabrous without, ciliate within, the margin densely ciliate, blue, the upper oblong-ovate, subacute, 20 mm. by 10 mm.; spur 18–20 mm. long, 3.5 mm. wide at base; lateral sepals elliptic, 20 mm. by 10 mm., obtuse; lower sepals somewhat narrower; petals black, the upper laminae almost straight, 12 mm. long, deeply bidentate, glabrous, the spur 14 mm. long; lower laminae 7 mm. long, oblong-ovate, short bearded at base, bifid to middle into oblong, ciliate lobes, claw appendiculate, 6 mm. long; stamens 7–8 mm. long, glabrous; carpels 3, glabrous.

TYPE: "Dagestania, inter pagos Czirch & Rhycza," leg. *Alexeenko*, July 23, 1898 (LE); seen.

Differs from *Delphinium flexuosum* and *D. bracteosum* in its elliptic or elliptic-ovate glabrous bracteoles.

228. *Delphinium sauricum* Schischk. Animadvers. Syst. Herb. Univ. Tomsk 1936(8): 1. 1937.

Stems solitary, erect, 3–5 dm. tall, from a thick rhizome, with longish spreading hairs; leaves petioled, these 6–14 cm. long, densely hirsute; blades round-reniform, deeply cordate at base, 4–6 cm. long, 2.5–4 cm. wide, deeply divided or coarsely toothed, with long appressed hairs on both surfaces; inflorescence racemiform, 1–2.5 dm. long, 6–10-flowered; lower bracts 2–3-lobed to middle, shorter than or subequal to the pedicels, upper bracts entire, lance-ovate, violet; bracteoles 2, lance-ovate, to 10 mm. long, 3–4 mm. wide; sepals blue-violet, more or less appressed hairy on both surfaces and mixed with a few lageniform hairs, broadly ovate, 14–15 mm. long, 10–11 mm. wide, the lower narrower, 15 mm. by 8 mm.; spur 20–23 mm. long; petals black-fuscous, the upper laminae 10 mm. long, 4–5 mm. wide, the lower deeply bifid, ciliate, yellow bearded on surface near the base; carpels 3, strigose.

TYPE: Montes Saur. In jugo Mus-tau toward head of Ulkun-Obo River, in alpine meadows, July 26, 1914, *W. Saposchnikov* (TK); I was unable to borrow material.

229. *Delphinium speciosum* Bieb. Fl. Taur. Cauc. 2: 12. 1808.

FIG. 18, J.

*Delphinium speciosum* var. *typicum biebersteinii* and *speciosum* var. *gymnopus* and var. *trichocarpum* Rupr. Fl. Cauc. 35. 1869, *fide* Nevski in Fl. U.S.S.R. 7: 128. 1937.

*Delphinium ironorum* N. Busch, Bull. Acad. Sci. U.S.S.R. 1931: 450. 1931.



Based on a collection by *E. & N. Busch*, Aug. 24, 1930, at 2750 m., from Dzhomakh, Mount? or Mountain Pass? Bakh-fandar (LE); seen.

*Delphinium bracteosum* var. *macranthum* Som. & Levier, and var. *albidum* Som. & Levier, Acta Horti Petrop. 13: 25. 1893; according to Nevski.

? *Delphinium caucasicum* var. *bracteosum* Schrenk & Trautv. Bull. Soc. Mosc. 80. 1860.

? *Delphinium speciosum* var. *bracteosum* Huth, Bot. Jahrb. 20: 416. 1895.

? *Delphinium boissieri* Boiss. & Buhse, Nouv. Mém. Soc. Nat. Mosc. 12: 8. 1860. *Delphinium speciosum* var. *boissieri* Buhse, Reise Turcm. u. Pers. p. 8. "Beim Dorfe Livan auf der Thalsohle," no. 539, June 18, 1947. Collector? Not seen.

Perennial from a woody root, the stem 3–8 dm. tall, simple or branched above, villous, striate, rather equably leafy throughout; leaves 3–12 cm. wide, rounded-pentagonal in outline, more or less villous on both surfaces, the hairs especially long on the veins of the upper surface, more generally distributed beneath, blades mostly 5-parted to near the base into broad cuneate segments, these incised-serrate into lanceolate lobes 2–10 mm. wide, long pointed; petioles somewhat dilated at base, villous, 3–15 cm. long; flowers racemose on axis or branches, the inflorescence densely villous, several to many flowered; lower bracts 3-parted to the base, the upper entire, lanceolate, villous, 7–15 mm. long; pedicels almost erect, 1–3 cm. long; bracteoles lanceolate, villous, 4–6 mm. long, placed just beneath the flower; sepals violet, villous without and somewhat within, upper sepal ovate, 18–25 mm. long, 8 mm. wide, rather sharply pointed, the spur 17–18 mm. long, 3 mm. wide at base, tapered rather rapidly to the narrow, somewhat decurved apex; lateral sepals 18–25 mm. by 10 mm.; lower sepals 20 mm. by 9 mm.; petals black, the upper laminae straight, 14 mm. long, deeply emarginate, glabrous, the spur 20 mm. long; lower laminae 8 mm. long, 4 mm. wide, oblong, turned to one side, with a patch of long yellow hairs near the base, white-ciliate, cleft ca. 3 mm., the claw broad, 6 mm. long; stamens glabrous, 6 mm. long; anthers dark, oblong, 1.2 mm. long; carpels 3, somewhat villous, becoming 15 mm. long; seeds dark, transversely lamellate-squamate, ca. 2 mm. long.

TYPE: Mt. Kaischaur, Caucasus, Herb. M. a. Bieberst., plant in photograph (κ) has 1 leaf and is in fruit. Another specimen labeled *Delphinium speciosum*, M. Comm. Stephan, ex Herb. Bieberstein, typus (photo. κ).

ILLUSTRATIONS. DELESSERT, Icon. Select. 1: pl. 62. 1820; Bot. Reg. 18: pl. 1503. 1832.

DISTRIBUTION. The species seems to range from the Caucasus to Turkestan.

EXAMPLES. Hisiar, in valle fl. Jaquob, *A. Regel*, Iter Turkestanicum (E, κ); Caucasus: *Bunge* in 1856 (P); South Ossetia, *E. & K. Busch* in 1935 (BM); Patcha Pass, *Seraischeniar*, *Komarov* in 1892 (κ); Circassia, source of the Lascha, *Alboff* in 1894 (P).



230. *Delphinium stapeliosum* Brühl ex Huth, Bot. Jahrb. 20: 419. 1895 and in Brühl & King, Ann. Bot. Gard. Calc. 5: 102. 1896.

FIG. 18, K.

*Delphinium stapeliosum* var.  *khasianum* Brühl in Brühl & King, Ann. Bot. Gard. Calc. 5: 102. 1896.

Stem erect, slender, 4–15 dm. tall, branched above, retrorse-pubescent, scattered leafy, the upper leaves reduced; lower petioles to 2.5 dm. long, slightly dilated at base, pubescent, the upper shorter; leaf blade to 15 cm. across, palmately 5-fid to 1 cm. or more from base, deep green and sparsely pubescent above, paler and more pubescent beneath especially on the veins, the segments broadly cuneate, entire in lower part, trifid above and then incised-dentate with large lance-ovate or broader teeth, acute; racemes lax, rather few flowered or the terminal raceme with more; bracts lanceolate to lance-linear, to ca. 10 mm. long; pedicels ascending, gray-pubescent, 1–8 cm. long; bracteoles lance-linear, 7–10 mm. long, alternate, near the middle of the pedicel; sepals blue to violet or reddish, hairy without, the upper sepal ovate, 18 mm. by 10 mm., obtuse, the spur slightly curved, 20 mm. long, 4 mm. wide at base, the apex fairly slender; lateral sepals rhombic-ovate, 18 mm. by 15 mm., rounded-truncate at apex; lower sepals somewhat narrower, 17 mm. by 10 mm., obtuse; petals blue-black, the upper laminae almost straight, 10 mm. long, glabrous, bidentate at apex, the spur 2 cm. long; lower laminae oblong, 6 mm. by 3 mm., deeply cleft, bearded but not ciliate, the claw 6 mm. long; stamens 5–6 mm. long, glabrous; anthers dark, linear, 1.3 mm. long; follicles 3, pubescent, divergent, slender, 12–18 mm. long, the styles an additional 3.5 mm.; seeds obpyramidal, winged along the edges, puckered on the sides.

LECTOTYPE: No specimens are cited in Brühl & King, but in Huth there is cited "Assam: Khasia Hills ad 2000 m. alt.," *Hooker and Thomson*. I would select the K specimen as the lectotype and cite also BM, E, GH, NY.

DISTRIBUTION. Eastern Nepal and Khasia, Assam, at elevations of about 1200 to 3000 m.

REPRESENTATIVE SPECIMENS. E. Nepal: *Stainton* 1162 (BM); *Stainton, Sykes & Williams* 7867 (BM), 8587 (BM). Khasia: *Clarke* 16354 (BM, K), 16117 (BM), 16381 (E), 6168 (K), 38970 (US), 40301 (US), 44861 (US); *Hooker & Thomson* (BM, E, GH, K, NY); *Griffiths* 461 (BM, K), 827 (K); *Chaud* 7192 (E, MICH), 31250 (MICH), *Koelz* 25579 (MICH), 31250 (E, MICH).

231. *Delphinium tianshanicum* W. T. Wang, Acta Bot. Sinica 10: 85. 1962.

FIG. 18, L.

Stems 5–11 dm. tall, terete, 2–5 mm. thick at base, sparsely retrorse-hirsute, few branched above, mostly simple, equably foliose; lower leaves long petioled (to 5 times as long as the blades); blades as in *D. naviculare*, broadly reniform or pentagonal-reniform, 3–9 cm. long, 5–14 cm. wide, cordate, 3-parted to 1 or 2 cm. from the base, the middle part rhombic, acute, 3-lobed above the middle, the lobes somewhat ovate, coarsely 4–5-



toothed, the lateral parts smaller, 2-3-toothed, densely strigulose on both surfaces; racemes 7-14-flowered, rather dense; lower bracts trifid, the others lance-linear, 8-14 mm. long, 1-1.5 mm. wide, strigulose; pedicels 2-6 cm. long, densely retrorse-strigulose, suberect; bracteoles 1.5-6 mm. below the flower, linear to lance-linear, 5-9 mm. long, strigulose; sepals blue-purple, ovate or obovate, 11-15 mm. long, densely strigulose; spur 11-14 mm. long, cylindric-subulate, 3 mm. thick at base, straight or slightly decurved; petals black, the upper laminae glabrous, emarginate, 9 mm. long; lower laminae subobovate, 5 mm. long, 2-lobed to near the middle, claw 6 mm. long, short-appendiculate; stamens glabrous; anthers over 1 mm. long; follicles 9-11 mm. long, densely strigulose, the styles 2 mm. long; seeds obconic, triquetrous 1.5 mm. long, scaly-lamellate.

TYPE: Sinkiang, *T. N. Liou* 3620, Aug. 24, 1931 (PE); not seen. Other specimens cited in the original description are also from Sinkiang, Ho-shuo, 2300 m., *Li & Chu* 7003 (E), seen, and Sha, 1700 m., *Kuan* 2290 (E), seen.

232. *Delphinium ukokense* Sergievsk. Animadvers. Syst. Herb. Univ. Tomsk 1954: 9. 1955.

Erect perennial, 2.5-4 dm. tall, 2-4 mm. thick below, leafy almost to the inflorescence, short-pubescent throughout, with gland-tipped hairs mixed in; leaves 3.5-6 cm. long, 4-6 cm. wide, round-reniform or rounded, 3- or 5-parted to 4/5 or 5/6 their length, the lobes rhombic, coarsely toothed above, short-pubescent on both surfaces; raceme 10-12 cm. long, lax, 6-15-flowered; lower bracts leafy; pedicels 5-10 mm. long; bracteoles linear; sepals blue, pilose; spur slightly curved at tip, 14-15 mm. long; petals brown, the upper laminae glabrous, the lower yellow-pubescent down to middle, ciliate; carpels 3, glabrous.

TYPE: Altai, Ukok, *Saposhnikov* in Herb. Krylov (TK); not available to me.

The author compared his species, *Delphinium ukokense*, with *D. mirabile*, but said the stems of the former were glandular-pubescent their whole length, the petioles shorter than or equal to the laminae; the flowers smaller; spur 14-15, not 16-20 mm. long; and the carpels glabrous.

233. *Delphinium villosum* Stev. ex DC. Syst. 1: 546. 1817; Prodr. 1: 55. 1824. FIG. 18, M.

*Delphinium villosum* var. *anomalum* Huth, Bot. Jahrb. 20: 412. 1895. Huth cited "in deserto Tentek," *Schrenk* 1840 (LE); not seen.

*Delphinium villosum* var. *winkleri* Huth, loc. cit. Huth cited Alexander Mts., Dschilamysch, 1600-2000 m., *Fetissow*, 1880 (LE); not seen.

*Delphinium rha* Schipcz. ex Nevski in Komarov, Fl. U.S.S.R. 7: 152. 1937, in synonym.

Stem 10-12 dm. tall, leafy, simple, glabrous below; petioles scarcely



dilated at base, to 15 cm. long, the upper reduced; blades glabrous or slightly pubescent on veins above, subvillous beneath, the lower truncate-cordate at base, the upper cuneate, all broader than long, the lower to 15 cm. broad, 3- or 5-parted to 1 cm. or more from the base, the parts cuneate-obovate, shallowly incised or coarsely toothed, with acute or acuminate teeth or lobes; raceme simple or few branched, many flowered, rather lax, 2–4 dm. long, minutely strigulose and with some retrorse-spreading soft pubescence; bracts mostly linear-subulate, villous, to ca. 1 cm. long; pedicels erect-divergent, 1–7 cm. long; bracteoles like the bracts, placed slightly below the flowers; sepals deep blue, sparsely villous; upper sepal 12–15 mm. long, 6–8 mm. wide, acute, the spur straight, about as long, rather slender; lateral sepals oblong-obovate, 12–14 mm. long, 6–8 mm. wide, villous along midrib, rounded at apex; lower sepals more pointed and more hairy; petals dark, the upper laminae almost straight, glabrous, 9 mm. long, entire, the spur 12 mm. long; lower laminae oblong-ovate, 3.5 mm. by 2.5 mm., long-bearded, cleft, the claw 6 mm. long; stamens 6–7 mm. long, the filaments ciliate; anthers dark, 1 mm. long; follicles 3, glabrous except on the ciliate sutures, oblong, 12–15 mm. long, 4–5 mm. wide, the styles an additional 3 mm.; seeds brown, 2.5 mm. long, slightly winged along the 3 angles.

TYPE: Hort. Dorpat, *Steven* in 1817 (G?) not seen; photograph (BH), seen.

EXAMPLES OF THE SPECIES. Cultivated at Ottawa from Tabor Bot. Gard.; Germany: *Gillett*, July 7, 1939 (BH); Chinese Turkestan: Mts. Bogdo-ola & Urumschi, *Merzbacher* 1304 (GH).

234. *Delphinium winklerianum* Huth, Bot. Jahrb. 20: 419. 1896.

FIG. 18, N.

Perennial, 6–8 dm. tall, with scattered stiff white hairs, rather equably leafy; midcauline leaves with petioles 2–8 cm. long, villous, scarcely vaginate, the blades ca. 1 dm. across, broadly cordate at base, 3-parted to ca. 1.5 cm. from base into broad-cuneate obovate segments ca. 4 cm. by 3–3.5 cm., scattered stiff-hairy on both surfaces, each segment with ca. 3 coarse ovate teeth to 1.5 cm. long and broad, mucronate, the uppermost leaves reduced; inflorescence with 2–3 basal branches, the central raceme to ca. 3 dm. long, laxly many flowered, somewhat strigulose, the pedicels suberect, 3–10 cm. long; lower bracts foliose, upper lance-linear, 1–1.5 cm. long; bracteoles subtending the flower, lanceolate, 8–10 mm. long, 2–2.5 mm. wide; flowers deep blue, sepals strigulose without, glabrous within, the upper sepal ovate, 17 mm. by 10 mm., obtuse, the spur spreading decurved, 17 mm. long, 3.5 mm. wide at base, blunt; lateral sepals broadly elliptic-obovate, 18 mm. long, 14 mm. wide, rounded at apex; lower sepals elliptic-ovate, 16 mm. by 8 mm., subacute; petals black, the upper laminae almost straight, 10 mm. long, rounded and bidentate at the glabrous tip, the spur 13 mm. long; lower laminae strongly oblique, ob-



long-obovate, 5 mm. by 3.5 mm., somewhat bearded, bifid about halfway into rounded-oblong lobes, the claw 6 mm. long; stamens 7–8 mm. long, the anthers dark, rounded, ca. 1 mm. long; carpels 3, hairy.

TYPE: June 4, 1881, Kasch, Turkestan, sem. m. Dr. A. Regel, *C. Winkler* 7230 (LE); seen.

[*To be continued*]